THE IRON TRADE REVIEW

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RECORD BREAKING.

CHARTERING OF VESSELS FOR CARRYING ORE AT UNPRECEDENTED RATE.

Hill Interests Not Acquired by Corporation.—Scarcity of Pig Iron at Chicago and Pittsburg.—More Rail Business.

The announcement that the interests which now control the Republic Iron & Steel Co. have elected a majority of the board of the Tennessee Coal, Iron & Railroad Co. comes as an important development in the southern situation; following, as it does, numerous futile efforts of recent years to consolidate the principal steel interests of the south. The attempt made about a year ago to form a consolidation of these concerns had one important result, because the the inventory of the properties then taken disclosed to a greater extent than had been formerly appreciated the great value of the southern ore deposits. The close affiliation and the probable consolidation of the Republic and Tennessee interests will doubtless result in making them an increasingly important factor in the manufacturing world. The properties of the Tennessee Co. include 17 blast furnaces, with an annual capacity of over 1,100,000 tons of pig iron; rolling mills at Bessemer, Ala.; steel works and steel casting plant at Ensley, Ala., and over 400,000 acres containing valuable deposits of coal and iron ore. The Republic Iron & Steel Co. has in operation or nearing completion, eight blast furnaces, with an annual capacity of 775,000 tons, numerous rolling mills, steel works at Youngstown, O., and about 26,000 acres of ore and coal lands in Alabama, as well as important holdings in the Lake Superior region.

The report that a deed covering the iron ore interests of James J. Hill and associates had been placed on file, conveying to the United States Steel Corporation all the Hill properties on the Mesabi range, is denied. The Hill interests on the Mesabi range have been in process of accumulation for the past eight years, during which time a consistent policy has been pursued, until these properties have become second only to the holdings of the United States Steel Corporation, and have been estimated as having deposits of from 400,000,000 to 500,000,000 tons. These holdings are well concentrated and while many of them are leased to operating and independent steel making concerns, much of the land and many of the located ore deposits are still in Mr. Hill's hands, for such disposition as may be desired.

Record breaking in the ore business continues. Not only have the production and shipments for 1905, and the sales for 1906 been far in excess of those of any other years, but within a few days chartering of vessels has been done at an unprecedented rate for this time of the year. Contracts have already been made for the carrying of nearly 10,000,000 tons of iron ore and the Steel Corporation will soon contract for 8,000,000 tons, while in its own vessels it will carry about 12,000,000 tons, so that within a few days ore to the amount of 30,000,000 tons will be provided for. The total ore movement by lake from the Lake Superior mines for the season just closed was 33,473,788 tons, of which the Steel Corporation shipped 18,779,374 tons. The all rail shipments will make the grand total for the season about 34,000,000 tons.

Indications that there will be a scarcity of pig iron in the early part of the new year are more pronounced. This is particularly true of the Pittsburg and Chicago districts. Many founders are finding that they will need more iron than they have purchased and the inquiry for Bessemer and basic is also strong. Steel makers in New York are inquiring for 30,000 tons of basic and it is expected that the Steel Corporation will soon buy a large tonnage of Bessemer and basic. An offer of $130.00 per ton for a small lot of ferromanganese failed to result in a sale. It is announced that the Illinois Steel Co., in addition to the open-hearth and blast furnace plants which will be built at South Chicago, will erect a blast furnace at Joliet.

There is still much complaint of the scarcity of crude steel at Pittsburg and Chicago. Many mills have been compelled to curtail operations on account of the short supply of steel.

Heavy orders for steel rails are pending including one for 50,000 tons from the Erie. The American Bridge Co. expects to add 50,000 tons in December to the already heavy orders which it has on its books. Railroads are buying extensively for bridges, among those now on the market being the Tidewater Railroad, which will require 17,000 tons. The American Ship Building Co. has placed orders for plates and sheets for three more large freighters. The shapes will be rolled at Pittsburg and the plates at Chicago.

Many rumors have been current of early advances in various finished lines, but it is not expected that plates and bars will be included Higher quotations on pipe and wire are more probable. Indeed, some interests are already obtaining more for pipe than the prices asked by the principal producer.

Coke is easier with furnace selling at $2.75 for prompt delivery, and $2.90 for January, while foundry coke is sold at $3.70 and $3.80.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Scarcity of Pig Iron Probable.—Wire Products Expected to Advance.—Crude Steel Shortage.

OFFICE OF *The Iron Trade Review*,
521 PARK BUILDING, December 20.

Conditions this week point to an acute situation in pig iron after the first of the year. There are no figures obtainable as to the stocks of iron on hand at the furnaces, but the general impression seems to be that they are by no means enough to make buyers feel easy as to their supply, if they have not already covered for their requirements. Despite the holiday season, when things are usually quiet, prices are strong and there seems to be a tension drawing tighter and a feeling of uneasiness on account of the prevailing opinion that there will be a shortage of first quarter iron. The recent purchase by the Cambria Steel Co., of 60,000 tons of Bessemer and Basic for delivery through the first three months of next year did not relieve that feeling but only went to make those who anticipate a shortage more confident in their opinion. Altogether this company has bought 80,000 tons. Other eastern buyers are expected to come into this market for pig iron for first quarter delivery, and the steel corporation has not yet made its purchase for that period.

Prices on finished material have not changed during the week, but before the end of the month there is almost sure to be an advance on wire products. The mills have no stocks on hand and sales have been heavy. A. M. Byers & Co., Pittsburg, on Monday announced an advance of ten percent on iron pipe, all sizes, but this has not been followed by other independent makers and the leading interest has made no change in its official quotations.

An advance in the price of plates and steel bars was anticipated, but now it is not probable that the leading interest will take any action for some time to come, at least. The leading interest is booked ahead until July 1, without doubt, and an advance now would not be of any practical benefit except to independent makers who are not filled that far ahead. The policy, too, has been not to advance prices during the present high tide of prosperity, although considerable pressure is being brought to bear in this direction by independent producers of finished material who buy their crude material from the corporation.

The scarcity of crude steel, more especially open-hearth, has curtailed tonnage output to an appreciable extent and from several sources information is received of plans for additional capacity to meet demands. Several interests who have been buying their semi-finished material in the market are now considering the erection of their own plants for their own requirements in this direction.

Pig Iron.—There has been considerable buying, although in small lots and several inquiries of sizable tonnage have been out during the past week. The purchase of 60,000 tons of Bessemer and Basic iron by the Cambria Steel Co., last week for first quarter delivery at the average monthly price during the period of delivery is taken as an indication of a shortage of iron for that delivery and it is anticipated that other eastern buyers will soon come to the Pittsburg district for Bessemer iron. As far as can be learned the Steel Corporation has not as yet made its purchase although this has been anticipated now for over a month. Prices are very firm at $17.50 valley furnaces for Bessemer and $17.75 has been done on a small lot. The market on Basic is $17.25. The American Car & Foundry Co., bought 2,500 tons of No. 2 foundry at $17.60, furnace, for delivery through the first half of next year. A lot of less than 1,000 tons of Virginia iron was sold into the Pittsburg district, although not in Pittsburg, at $16.50 furnace, for delivery through the whole of next year and sales of Bessemer, altogether aggregating 4,000 or 5,000 tons have been made at $17.50. One lot of 600 tons of Southern iron was sold on the basis of $14.50 for No. 2, Birmingham, and offers to buy at a lower figure have been turned down at the furnaces. We quote:

Bessemer, Valley	$17.50 to 17.75
Bessemer, Pittsburg	18.35 to 18.60
No. 1 Foundry, Pittsburg	18.60 to 18.95
No. 2 Foundry, Pittsburg	18.10 to 18.35
Gray Forge, Pittsburg	17.10 to 17.60
Basic, Valley	17.25 to 17.50
Basic, Pittsburg	18.10 to 18.35

Ferro-Manganese.—One New York broker with two cars of ferro-manganese, 80 percent, ready for immediate shipment, has asked for bids and was offered $130, but the sale was not made. A small quantity has been sold at $125 per ton. Quotations with guaranteed delivery after July 1 have been made at $95. The scarcity for prompt delivery is as acute as ever.

Structural Material.—New business has been coming in at a satisfactory rate and this despite the fact that deliveries are many months behind. Inquiries are out for prices on material for a twelve or sixteen story building, Pittsburg, but on account of the let-up in building during the winter months the demand for this class of structural material has not been as pressing as heretofore. The rush of work at lake shipyards has made the demand for this class of structural shapes brisk and still further contracts are expected. We quote as follows: Beams and channels, 15 in. and under, 1.70c; over 15 in., 1.80c; zees, 1.70c, 1.75c; angles, from 3 to 8 in., inclusive, 1.70c; universal and sheared plate, 6¼ in. and wider, 1.60c, base.

Plates.—There is but little likelihood that the leading interest will advance its price on plates in the immediate future as its mills are filled for delivery six months ahead and no advantage could be gained at this time by boosting prices. The scarcity of open-hearth material has been a serious feature and has curtailed the tonnage output to a considerable extent. We continue to quote:

Tank plate, ¼ in. thick, 6¼ in. to 100 in., 1.60c, f. o. b. mill, Pittsburg. Extras are as follows per 100 lb.: Flange and boiler steel, 10c; marine, A. B. M. A. and ordinary fire box, 20c; still bottom, 30c; locomotive fire box, 50c; plates over 100 in. up to 110 in. in width, not less than 5c extra; plates 110 in. to 115 in. wide, not less than 10c extra; 115 to 120 in., not less than 15c extra; plates 120 in. to 125 in. wide, not less than 25c extra; plates 125 in. to 130 in., not less than 50c extra; plates 130 in. wide, not less than $1 extra; plates 3-16 in. thick, 10c extra; gauges 7 and 8, 15c extra; No. 9, 25c extra. Five cents extra for less than carloads. Terms net cash in 30 days, and for all points of delivery in the United States except Pacific Coast.

Skelp.—There has been comparatively little business done in this market and we quote as follows: Bessemer, grooved, 1.65c to 1.70c; sheared, 1.70c to 1.75c; Basic, grooved, 1.65c to 1.70c; sheared, 1.70c to 1.75c; iron, grooved, 1.65c to 1.75c; sheared, 1.80c.

Muck Bar.—On the basis of $32, delivered Pittsburg, there has been considerable business in muck bar although the supply is by no means plentiful. The leading interest is not selling muck bar at all and the only concerns on the market are the Republic Iron & Steel Co., Youngstown and the Kittanning Iron & Steel Co., Kittanning,

Pa. The business for the past week has been mostly in small lots.

Sheets.—Business is reported good by both the leading interest and the independent manufacturers. Prices have not changed and the leading interest reports all consuming customers eager for shipments, which indicates that the tonnage is not speculative but is actually needed. The American Sheet & Tin Plate Co. has all of its sheet mills with the exception of the Midland plant at Muncie, Ind. in operation and 85 percent of tin mills are running, and in the latter case conditions could be improved if the company was not subjected to shortage of cars and supply of raw material. We continue to quote:

American Bessemer steel sheets, box annealed, cold rolled, one pass: Nos. 11-12, 1.90c; Nos. 13-14, 1.95c; Nos. 15-16, 2c; Nos. 17-21, 2.05c; Nos. 22-24, 2.10c; Nos. 25-26, 2.15c; No. 27, 2.20c; No. 28, 2.30c. Galvanized Nos. 10-11, 2.25c; Nos. 12-14, 2.35c; Nos. 15-16, 2.45c; Nos. 17-21, 2.60c; Nos. 22-24, 2.75c; Nos. 25-26, 2.95c; No. 27, 3.15c; No. 28, 3.35c. Corrugated roofings, 1.70c per square for No. 28, painted, 2½ in. corrugation; 2.95c per square for No. 28, galvanized, 2½ in. corrugation. Quotations f. o. b. Pittsburg for large lots.

Billets.—The scarcity of billets still continues unabated and several of the large producers are entirely out of the market, either using all they make or having sold ahead as far as they care to go. Bessemer billets are still quoted strong at $26.50, which is a nominal quotation, there being practically no market upon which to base quotations. Open hearth billets are quoted from $27 to $28 and sheet bars $27. Forging billets, in several orders of car load lots sold during the week at $33, Johnstown.

Pipes and Tubes.—New tonnage continues to be booked at all the mills and the demand for merchant pipe is good. Although the National Tube Co. has not announced a change in prices one company in Pittsburg has made an advance of 10 percent all along the line on iron pipe as an independent action without consulting other interests which have not followed the example. Some makers of pipe, in order to comply with old contracts, have been selling at actual cost and in one or two instances have been filling old contracts at a loss, this being due to the high price of raw material. Official discounts of the leading interest are as follows:

	Steel		Iron	
Consumers' Carloads	Black	Galv.	Black	Galv.
⅛ and¼ inch	71	55	68½	52½
⅜ and ½ inch	75	63	72½	60½
¾ to 6 inches	79	69	77	67
7 to 12 inches	74	59	72	56½
EXTRA STRONG PLAIN ENDS.				
⅛ to ¼ inch	64	52	61½	49½
⅜ to 4 inches	71	59	68½	56½
4½ to 8 inches	67	55	64½	52½
Double extra strong plain ends, ⅜ to 8 inches	60	49	75½	49½

MERCHANT BOILER TUBES, CARLOADS, 22 FEET AND UNDER.

	Steel	Iron
1 to 1½ inches	44	41
1¾ to 2¼ inches	56	41
2½ inches	58	46
2¾ to 5 inches	64	53
6 to 13 inches	56	41

Less than carload lots two points less.
2½ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 percent net extra.

Merchant Steel.—Specifications on old contracts and bookings of new business continues to be brisk. The Crucible Steel Co., at its recent directors' meeting declared the first dividend in two years, and reported business in excellent shape, and set aside a large fund for further equipment and additional capacity. Deliveries are behind and in some instances premiums as high as $4 have been secured for prompt shipment. The demand for shafting is heavy. We quote:

Cold rolled and ground shafting, 50 percent off in carload lots, and 45 off in less than carloads, delivered in base territory; tire steel, 1.70c; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flat, 1.50c to 1.55c; smooth finished machinery steel, 1.70c to 1.75c; toe calk, 2c to 2.05c. The price of planished and machine straightened tire is 1.70c base half extras as below. Iron finished tire up to 1½ in. by ½ in., 1.65c base half extra tire list. Iron finished tire 1½ in. by ½ in. and over to be sold on regular bar basis of 1.50c base, half extras steel card. New extras on steel tire is as follows: 1 in. by ¼ in. and heavier, base; 1¼ in. x 3-16 in. and 7-32 in., 20c; 1 in. to 1 7-16 x 3-16 and 7-32 in., 30c; 1 in. to 1 7-16 x ⅛ in., 50c; ⅞ in. x ¼ in., 30c; ⅞ in. x 3-16 and 7-32 in., 50c; ⅞ in. x ⅛ and 5-32 in., 60c; ¾ in. x ¼ in., 30c; ¾ in. x 3-16 and 7-32 in., 80c; ¾ in. x ⅛ in. and 5-32 in., 1.00c; ⅝ in. x 3-16 in., 1.00c; ⅝ in. x ⅛ and 5-32 in., 1.10c:

For intermediate sizes, the next higher extra to be charged in all cases. Sizes not shown are subject to special arrangement.

Wire and Wire Nails.—Jobbers are specifying freely on their old contracts and their stocks, as far as can be learned, are not heavy. One of the largest mills in this district has absolutely no stock on hand, and is shipping practically from the machines. The past two or three weeks has been far ahead of the same period last year, there is inquiry for delivery far ahead and the trade, practically sure of an advance before the first of the year, is preparing for it by laying in stocks or placing contracts before the announcement is made. Mills are being pressed for delivery. We quote:

Wire nails, jobbers' carload lots, $1.80; retailers' carload lots, $1.85, and less than carloads, $1.95; painted barb wire, $1.95 for jobbers in carloads; retailers' carload $2, and less than carloads, $2.10, with 30c for galvanizing. Annealed smooth fence wire is held at $1.65, with the usual differentials to retailers for carloads and less than carloads. Quotations are all f. o. b. Pittsburg, 60 days, with 2 percent discount for cash in 10 days. Iron and steel cut nails, $1.75 to $1.80.

Rails and Track Material.—Although booked ahead practically until next September, mills are receiving new contracts from the railroads and new business continues to be as active as it has been. The demand for light rails has been heavy. We quote:

Fifty pounds and heavier, 500 ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 16-lb. $29; 20-lb. $27.50 to $28; 25 to 45-lb., $27; angle bars for standard sections, 1.50c; spikes, $2.

Merchant Bars.—With the first of the year and new contracts to be made, a heavier demand for steel bars is anticipated on account of the high price of iron bars, which are quoted $10, above steel bars. Some business has been done on the base of 2c Youngstown, or 2.05c Pittsburg on iron bars, but the demand has not been very heavy on new business, most consumers being pretty well taken care of on old contracts. We quote:

Common iron bars, 2c, Youngstown; 2.05c, Pittsburg; hoops 1.85c in carload lots, and 1.95c in less than carload lots, with regular hoop card for extras. Bands, 1.50c; Bessemer steel bars, 1.50c; open-hearth steel bars, 1.50c; plow and cultivator, 1.50c, net; channels, angles, zees and tees under 3 in., 1.60c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 lb., 10c advance; less than 1,000 lb. of a size, 30c advance.

Old Material.—There has been but little business done in scrap, the opinion of dealers being that consumers are waiting until after their holiday inventory before buying. We quote as follows:

Heavy melting stock, $17.50 to $18; old steel rails, long

lengths, $18 to $18.50; No. 1 cast scrap, $15 to $15.50; heavy cast scrap borings, $10.75 to $11; bundled sheet scrap, $15.50 to $15.75; No. 1 wrought scrap, $20.50 to $21; low phosphorus scrap, $20 to $21.

Coke.—The open weather and good car supply in the coke region has had a tendency to keep prices down and on furnace coke $2.75 for spot delivery is the ruling price. For January delivery $2.90 is quoted. Several coke plants usually requiring their capacity on contracts are on the market with coke for spot shipment and foundry coke is quoted $3.70 to $3.80. During the week ending Dec. 9 the production for the Connellsville region was 282,530 tons and for the lower Connellsville region 90,767 tons. A summary of the week showed 22,168 of a total of 23,313 ovens in active operation. The shipments amounted to 12,016 cars.

CHICAGO.

Illinois Steel Co. Will Erect a Furnace at Joliet.—Building Prospect for 1906 Very Bright.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BUILDING, December 20.

Specifications for all forms of material continue heavy. In some lines, the nearness of the Christmas holidays has decreased the volume of new business, but no change is noted otherwise. The entire output of mills and furnaces goes into immediate consumption, and buyers are as eager as ever to get the material due on their contracts. The shortage of crude steel and pig iron continues very pronounced. In addition to the new open-hearth plant and blast furnace which the Illinois Steel Co. has under construction at the South Works, it is learned that the company contemplates the erection of another blast furnace at Joliet to take up part of the shortage there. No contracts have been let, but plans are being rapidly prepared. It is expected that the additions at South Chicago will be completed by March 1, when temporary relief will be afforded. Heavy contracting for track supplies has followed the unparalleled demand for rails, and spikes and bolts have been advanced $1 a ton by one Western interest. New tonnage in plates and structural steel was augmented last week by the specifications of the American Shipbuilding Co., for three more lake freighters, aggregating 10,000 tons. The structural shapes will be rolled at Pittsburg, and the plates at South Chicago. Structural contracts for 1906 requirements from the general trade are coming in freely. Many evidences are apparent that next year will witness a tremendous building boom in Chicago, and contractors are placing their orders early to insure delivery. Bids were published this week for the requirements of the new county court house to be erected in Chicago. They call for about 10,000 tons of steel. Iron and steel bars are strong and without change in price. No improvement is noted in light sheets, and the official schedule can be shaded $1 a ton in this market. Scrap and coke are easier, due to the prevalence of mild weather, facilitating shipments.

Pig Iron.—The holiday season is giving the pig iron market a much needed rest. There is some trading, but it is wholly confined to small tonnages, usually for filling in shortages developed by delayed shipments or of increased melt and invariably for quick shipment. No loss of strength has followed this decrease in business; on the contrary, it has served to illustrate how firmly intrenched sellers are behind their present schedules. In past years, the holiday dullness has been followed by lower prices, but no such experience is anticipated next month. The tremendous consumption and low stocks will prevent any tendency in this direction; and should any serious interference be felt in deliveries, prices will go higher. Two more furnaces were blown out last week for relining, one belonging to the Sloss-Sheffield Steel & Iron Co. and the other to the Iroquois Furnace Co. of Chicago. As each stack will be idle about six weeks, it means a total loss in output of between 18,000 and 20,000 tons for the entire period, and a corresponding delay in shipments. The Illinois Steel Co. is rushing work on its new furnaces at South Chicago and expects to have them in operation by March 1. The company is also contemplating the erection of a new furnace at Joliet, the plans for which are now being drawn up. Northern and Southern No. 2 foundry are still quoted at $19.00 and $14.50 furnace respectively, or $19.50 and $18.15 Chicago. Our prices on Jackson county silvery have been raised $1 a ton. We quote as follows:

Lake Superior charcoal	$20.00 to 20.50
Northern Foundry No. 1	20.00 to 20.50
Northern Foundry No. 2	19.50 to 20.00
Northern Foundry No. 3	19.00 to 19.50
Northern Scotch Foundry	20.00 to 20.50
Ohio Strong Softeners No. 1	20.30 to 20.80
Ohio Strong Softeners No. 2	19.80 to 20.30
Southern Foundry No. 1	18.65 to 19.15
Southern Foundry No. 2	18.15 to 18.65
Southern Foundry No. 3	17.65 to 18.15
Southern Foundry No. 4	17.40 to 17.90
Southern No. 1 Soft	18.65 to 19.15
Southern No. 2 Soft	18.15 to 18.65
Southern Gray Forge	16.65 to 17.15
Southern Mottled	16.40 to 16.65
Southern Silveries (4 percent 6 percent Silicon)	19.15 to 19.40
Jackson Co. Silveries 6 %, 21.30; 8 %, 22.30; 10 %,	24.30
Alabama and Georgia Car Wheel	22.65 to 23.15
Malleable Bessemer	20.00
Basic Iron	18.65 to 18.90

Billets.—The scarcity of crude steel continues of a pronounced nature in this market. Wire rods are difficult to obtain and are firmer in price; rerolling billets or sheet bars are unobtainable, and forging billets, of which one mill has a limited output for sale, are offered at $35 Chicago. Wire rods are quoted $33 Pittsburg and chain rods $35.00.

Bars.—The market remains strong. The holiday season and the fact that many consumers take inventory during December, have, combined, done much towards reducing sales of bar iron, but they have not materially affected the demand for steel bars. No weakness is apparent in the price of the former as a result of this ebb in business, and 1.85c Chicago is the minimum quotation of local mills. From this price, it ranges to 2c, according to the condition of the mill. Specifications for steel bars continue in excess of output, and there are few, if any, mills that are not several weeks behind in shipments. Premiums of $3 to $5 a ton have been paid in many instances for quick shipment. We quote carload lots, mill shipments, Chicago delivery, as follows: Soft steel bars and bands, 1.66½c, half extras; soft steel angles less than 3 x 3, 1.76½c; hoops, 1.91½c, base, full extras; hard steel angles, 1.70. to 1.80c. Jobbers' prices are very firm as follows: Bar iron, 2c to 2.10c full extras; soft steel rounds and squares, 2 in. and larger, $2 per 100 lb. base; flats, 2 in. and 4 in. x 1⅛ in. and thicker, $2 per 100 lb. base; flats, 4½ in. x 5 in. and 6 in. x 5-16 in. and thicker, $2 per 100 lb. base; all ovals, half ovals and half rounds, $2 per 100 lb. base. Other sizes not mentioned above, $1.85 per 100 lb. base, plus half extras.

Sheets.—Specifications against existing contracts are of good volume, but new tonnage is light. The present lull is regarded as a seasonable dullness and trade is expected to pick up after the first of the year. The irregularity in prices, noted heretofore, continues, though to a less degree than formerly. Desirable specifications for box annealed sheets can still be placed in this market at $1 a ton below the official schedule. Blue annealed sheets

are stronger, and established prices are now being more firmly maintained by those independent interests that have shaded them up to a few days ago. We have accordingly revised our prices on these gauges, and quote carload lots, mill shipments, Chicago delivery, as follows: Blue annealed, Nos. 8, 9, 10, 1.86½c; Nos. 11-12, 1.91½c; Nos. 13-14, 1.96½c; Nos. 15-16, 2.06½c. Box annealed, Nos. 18-20, 2.16½c to 2.21½c; Nos. 22 and 24, 2.21½c to 2.26½c; Nos. 25 and 26, 2.26½c to 2.31½c; No. 27, 2.31½c to 2.36½c; No. 28, 2.41½c to 2.46½c; No. 29, 2.55½c to 2.61½c. Jobbers report a good business and that store prices are firm. We quote as follows: No. 10, 2c to 2.10c; No. 12, 2.05c to 2.15c; No. 14, 2.10c to 2.20c; No. 16, 2.20c to 2.30c; Nos. 18 and 20, 2.40c to 2.50c; Nos. 22 and 24, 2.45c to 2.55c; No. 26, 2.50c to 2.60c; No. 27, 2.55c to 2.65c; No. 28, 2.65c to 2.70c; No. 30, 3.15c to 3.35c.

Quotations on galvanized sheets, mill shipments, carload lots, Chicago delivery, are as follows: Nos. 10 and 11, 2.36½c to 2.41½c; Nos. 12 and 14, 2.46½c to 2.51½c; Nos. 15 and 16, 2.56½c to 2.61½c; Nos. 17 and 21, 2.71½c to 2.76½c; Nos. 22 and 24, 2.86½c to 2.91½c; No. 26, 3.06½c to 3.11½c; No. 27, 3.26½c to 3.31½c; No. 28, 3.46½c to 3.51½c. From store, galvanized sheets are quoted as follows: Nos. 10, 12 and 14, 3c to 3.10c; Nos. 16, 18 and 20, 2.90c to 3c; Nos. 22 and 24, 3.05c to 3.15c; No. 26, 3.25c to 3.35c; No. 27, 3.45c to 3.55c; No. 28, 3.65c to 3.75c.

Plates.—New tonnage this week included the contracts for the steel required in the construction of three large lake freighters. The plates, of which between 3500 and 4000 tons will be required, went to the Illinois Steel Co., and the balance of the material to the Carnegie Steel Co. Specifications are active though not as heavy in tonnage as before, and deliveries can be given within a month's time by the local mill. Prices are without change, and we quote carload lots, mill shipments, Chicago delivery, as follows: Tank steel, ¼-in. and heavier, up to 100 in. wide 1.76½c base; flange steel, 1.86½c base; marine steel, 1.96½c base; all full extras. Plates, 3-16 in. thick, $2 extra; gauges, 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, $5 extra. Local jobbers report a stiff demand from stock and prices are very firm. We quote tank steel, ¼ in. and heavier, up to 72 in. wide, 2c to 2.10c; 72 in. to 96 in. wide, 2.10c to 2.20c; 3-16 in. up to and including 60 in. wide, 2.10c to 2.20c; 3-16 in. to 72 in. wide, 2.35c to 2.45c; No. 8, up to 60 in. wide, 2.25c; flange steel 25c extra; heads, 25c extra.

Structural Steel.—Contracting for 1906 requirements is of fair volume, a week's business seldom falling below 5,000 tons. With scarcely an exception, all the mills are overwhelmed with specifications, and three months is the earliest delivery that can be promised on new business. The structural mill at South Chicago is running again, the entire output being applied on Carnegie contracts as before. No new business has been taken for shipment from this mill, and none will be accepted until the corporation has caught up on its orders. The American Ship Building Co. has placed its contract for the shapes required in the construction of the three new lake freighters, mentioned some weeks ago. About 5000 tons will be required, all of which will be shipped by the Carnegie Steel Co. Bids for the new county building to be erected in Chicago are out and call for between 9000 and 10,000 tons of structural steel. The contract for the erection of the addition to the Auditorium Annex Hotel has been let and about 3500 tons of shapes will be required. Official prices are without change, though premiums are frequently paid for quick delivery. We quote mill shipments f. o. b. Chicago, as follows: Beams and channels, 3 to 15 in., inclusive, 1.86½c; angles, 3 to 6 in., 1.86½c; angles, larger than 6 in., on one or both legs, 1.96½c; beams, larger than 15 in., 1.96½c; zees, 3 in. and over, 1.86½c; tees, 3 in. and over, 1.91½c, with the usual extras for cutting to exact lengths, punching, coping, bending, or other shop work. Quotations on lots from store are as follows: all angles, 3 in. and larger, $2.25 per 100 lb. base; tees, 3 in. and larger, $2.30 per 100 lb. base; 3, 5, 9, 12 and 15 in. beams, $2.25 per 100 lb. base; 4, 8 and 10 in. beams, $2.50 per 100 lb. base; 6, 7, 18, 20 and 24 in. beams, $2.75 per 100 lb. base; 3, 4, 9, 12 and 15 in. channels, $2.25 per 100 lb. base; 6, 7, 8 and 10 in. channels, $2.50 per 100 lb. base; 5 in. channels, $2.75 per 100 lb. base.

Rails and Track Supplies.—The phenomenal contracting for heavy rails that has marked the closing months of the year, has been followed by a heavy volume of specifications for early shipment and an increasing demand for track supplies. The dimensions of the latter movement may be assumed from the fact that one large Western interest sold its entire output of spikes and track bolts for December in the first two weeks of that month. Specifications are very heavy and all producers are behind in their shipments. Light rails continue firm at the new prices; the Milwaukee plant is sold up for the next three months. Several small contracts for heavy rails were placed with the local mill last week, aggregating about 15,000 tons. We quote as follows: Heavy sections in 500 ton lots, f. o. b. mill, $28; less than 500 tons to car lots, $30; less than carload lots, $32. Light rails f. o. b. Milwaukee mill: 12-lb. sections, $32; 16-lb., $31; 20-lb., $30; 25-lb., $28; 30, 35, 40 and 45-lb. sections, $27.50. Track supplies f. o. b. Joliet are as follows: Angle bars, 1.50c to 1.75c; track bolts, 3¼ x ¾, with square nuts, $2.50 to $2.60 per 100 lb.; with hexagon nuts, $2.65 to $2.80.

Merchant Steel.—The easing off in other lines of agricultural material is not noticed in the demand for this product. Specifications are as insistent and voluminous as ever, and several firms have attempted to place supplementary orders. Prices are without change. We quote carload lots, mill shipments, Chicago delivery, as follows: Spring steel, 2.10c; sleigh shoe, flat sizes, 1.71½c; concave and convex, 1.86½c; cutter shoe, 2.35c to 2.40c; smooth finished machinery steel, 1.91½c; smooth finished tire, 1.86½c; plow steel, 2.20c and upward, according to quality; toe calk steel, 2.21c; railway spring, 1.86½c. Cold rolled shafting 50 and 2½ percent off to dealers, 50 percent off in carload lots, and 45 percent in less than carload lots. Crucible tool steel, 6½c to 8c; special grades of tool steel, 13c and up.

Cast Iron Pipe.—Demand for pipe has dwindled to almost nothing. The inactivity, however, is seasonable and no change is looked for until the early approach of spring. All pipe foundries, however, are busy, specifications against existing contracts being heavy. Prices are firm and without change. We quote carloads, f. o. b. Chicago: 4-in. water pipe, $31; 6, 8, 10 and 12-in. $30; larger sizes, $29.50; gas pipe, $1 extra.

Merchant Pipe.—Specifications grow lighter with the advancement of winter. Jobbers generally take inventory around the holiday season, and this fact combined with the gradual lessening of building operations, is largely the cause of the present lull. Prices remain firm and are without change. We quote carload lots, f. o. b. Chicago, ¾ to 6-in. black steel pipe, 78.35 percent discount from list. From stock, jobbers' discounts are 76½ to 77 percent.

Boiler Tubes.—No decline is noted in the demand for tubes. Jobbers report a good movement from their

stocks, all branches of the trade buying freely. Shipments from mills are slow. Prices are firm and without change. We quote carload lots, Chicago delivery, as follows:

	Steel.	Iron.	Seamless.
1 to 1⅛ inches	40.35	37.35	53.00
1¾ to 2¼ inches	54.35	39.35	40.00
2⅜ inches	56.35	44.35	43.00
2¾ to 5 inches	62.35	51.35	
Up to 4½ inches			50.50
6 to 13 inches	52.35	37.35	

Less than carload lots from store, as follows:

	Steel.	Iron.	Seamless Steel.
1 to 1⅛ inches, inclusive	40	35	42½
1¾ to 2¼ inches, inclusive	50	35	35
2⅜ inches, inclusive	52½	35	30
2¾ to 5 inches, inclusive	60	47½	42½

Wire Products.—The increasing cost and scarcity of billets and rods is expected to force an advance in the price of nails and other forms of wire products before many weeks. The independent mills are said to be in favor of a move in this direction and are reported to be pressing the leading producer to take the initial step. Stocks in jobbers' hands are low, especially of nails and open fencing, but the congestion of specifications on mill books prevents complete relief. The scarcity of cars in the middle west has been one drawback to this consummation, though the principal reason is the fact that consumption has been greatly in excess of production. Prices are firm and without change. We quote carload lots to jobbers, mill shipments, Chicago delivery, as follows: Wire nails, $1.95; painted barb wire, $2.10; galvanized barb wire, $2.40; smooth annealed wire, $1.80; smooth galvanized barb wire, $2.10; polished staples, $2.10; galvanized staples, $2.35. Carload lots to retailers, 5 cents higher than above prices; less than carload lots, 15 cents higher are quoted.

Old Material.—An unusual quietness prevails in the scrap market. Some trading of course is being done, but it is of an intermittent character and confined largely to material on track which has to be sold to escape demurrage charges. The present mild weather is not calculated to add strength to scrap values, and its continuance for so long a period has loosened the hold which the big dealers had on the situation. Several have already been forced to dispose of part of their stocks, and while this has been done without materially affecting general market conditions, the continued absence of wintry weather is certain to result in a cheaper market. The Burlington list, out yesterday, amounts to nearly 2500 tons; all the lists mentioned a week ago have been taken up. With the exception of cast and mixed borings, which are 50 cents higher, our prices are without change. We quote gross tons, as follows:

Old Steel Rails (4 feet and over)	$17.25 to 17.75
Old Steel Rails (less than 4 feet)	16.50 to 17.00
Old Iron Rails	23.00 to 23.50
Relaying Rails, subject to inspection	26.50 to 27.00
Heavy Melting Steel	15.00 to 15.50
Mixed Country Steel	12.50 to 13.00
For net tons we quote as follows:	
No. 1 R. R. Wrought	$18.00 to 18.50
No. 2 R. R. Wrought	17.50 to 18.00
Shafting	18.00 to 18.50
Dealers' Forge No. 1	14.50 to 15.00
Wrought Pipe and Flues	12.50 to 13.00
No. 1 Cast, 150 lbs. and less	14.50 to 15.00
No. 1 Mill	9.50 to 10.00
No. 1 Busheling	13.00 to 13.25
Mixed Busheling	12.25 to 12.75
Country Sheet	8.50 to 9.00
No. 1 Boilers Cut	12.50 to 13.00
Boiler Punchings	15.00 to 15.50
Iron Car Axles	24.00 to 24.50
Steel Car Axles	20.00 to 21.00
Iron Axle Turnings	11.50 to 12.00
Cast Borings	10.50 to 11.00
Mixed Borings, etc	10.50 to 11.00
Machine Shop Turnings	11.75 to 12.25
Railroad Malleable	15.00 to 15.50
Agricultural Malleable	14.00 to 14.50
Stove Plate and Light Cast Scrap	12.00 to 12.50
Old Iron Splice Bars	20.00 to 20.50

Coke.—The local market continues in a demoralized condition. Ample shipments from all points are daily received, and the growing quantity of demurrage coke thrown on the market prevents the maintenance of any fixed schedule of values. Connellsville 72-hour foundry brands range in price from $3 upwards at the ovens. By-product coke is held firm at $6.15 Chicago.

CINCINNATI.

Market is Quiet, With Car Shortage Troublesome.—January Will Prove Test.

December 19 1905.

Pig Iron.—The situation has shown but little change during the week and the market remains quiet. One inquiry for about 2,000 tons of grey forge from a manufacturer in Indiana resulted in the closing of the business on the basis of $12.75 Birmingham. This, however, is not taken as an indication of weakness, as it is well known that No. 4 foundry and grey forge are more plentiful than the higher grades. So far as southern iron is concerned, $14.00 Birmingham for No. 2 foundry is still minimum with $14.50 the asking price, but it develops that when sales are made $14 has been done. One of the large furnace interests which came into the market last week on the $14.50 basis has again withdrawn. Buyers are calling for iron on contracts and the shortage of cars is said to be interfering with delivery. In northern iron we hear of no transactions and nominal quotations of $17.50 to $18.00 at southern Ohio furnaces for No. 2 foundry with most of the furnaces asking the higher price. The trade generally expects to see but little business done now until after the holidays and trade talk indicates that the crucial test of the market will come by the middle of January when buyers will indicate how well they are supplied for the first and second quarter of the year. Should an important demand develop at this time, it is believed that there will be a strong advance in prices. On the other hand, if a period of waiting begins the high grade of production may furnish cause for a depressing influence. So far as the present is concerned, there is every indication of heavy consumption and nothing appears to be in sight to furnish cause for a discontinuance of the present activity. We quote f. o. b. Cincinnati as follows:

Southern Foundry No. 1	$17.25 to 17.75
Southern Foundry No. 2	16.75 to 17.25
Southern Foundry No. 3	16.25 to 16.75
Southern Foundry No. 4	15.75 to 16.25
Southern Foundry No. 1, soft	17.25 to 17.75
Southern Foundry No. 2, soft	16.75 to 17.25
Gray Forge	15.75 to 16.00
Northern Foundry No. 1	19.15 to 19.65
Northern Foundry No. 2	18.65 to 19.15
Northern Foundry No. 3	18.15 to 18.65
Jackson County Silvery, 8 percent	20.15 to 20.65
Southern Charcoal	19.75 to 20.25

Finished Material.—The market continues active and strong and a further advance in bar iron is reported. Jobbers report a good inquiry for nearly everything on the list with the leading activity in bar iron and structural shapes. Bar iron is quoted at 1.85 to 1.90c; steel bars at 1.63c, half extras with dealers quoting 1.85c for iron and steel out of store. Galvanized sheets No. 10 and No. 12, in car lots are 2.48c. We quote black sheets. No. 27 at 2.30c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.75c; No. 27, 2.65c; No. 16, 2.25c; No. 14, 2.15c; No. 12, 2.05c. Tank plates are firm and sell out of store at 2c for ¼in. and 2.10c for 3-16, Nos. 8 and 10. Beams and channels are quoted at 2.25c to 2.50c from stock and angles at 2c to 2.05c for base sizes.

In merchant pipe the market is stronger and the schedule of the leading interests is fairly well maintained.

We quote f. o. b. Cincinnati:

MERCHANT PIPE.
(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛ and ¼ inches	60.7	53.7	67.2	51.2
⅜ and ½ inches	73 7	61.7	71.2	59.2
¾ to 6 inches	77.7	67.7	75 7	65.7
7 to 12 inches	72.7	57.7	70 7	55 2

Coke.—The market is quiet and the feature of the situation is the getting forward of coke on contracts. There is very little doing in the way of new business and prices are a shade easier. Quotations from the leading coke producing districts are as follows:

†Wise County, Va. Furnace Coke prompt shipment.	$ 3.00 to 3.25 per ton
Wise County, Va. Foundry Coke prompt shipment.	3.75 per ton
Pocahontas Furnace Coke on contracts	
Pocahontas Foundry Coke on contracts	
Connellsville Furnace Coke prompt shipment	3.00 to 3.25 per ton
Connellsville Foundry Coke prompt shipment	3.75 to 4.00 per ton
New River Foundry Coke on contracts or prompt shipment.	3.50 to 3 75 per ton
New River Furnace Coke, prompt shipment	3.00 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.65 per ton on $9.00 pig iron, plus 17 percent of the advance on pig iron above $9.00 Birmingham.

Old Material.—The market remains firm with a good demand and dealers asking full prices. We quote f. o. b. Cincinnati:

Old No. 1 railroad wrought, net tons	$17.50 to 18.00
Cast machine and foundry, net tons	14.00 to 14 50
Old iron rails, gross tons	24 00 to 25 00
Old steel rails, gross tons	16 50 to 17.00
Old short lengths, gross tons	17 50 to 18.00
Old iron axles, net tons	23 50 to 24.00
Stove plate, net tons	10 50 to 11.00
Wrought turnings, net tons	11 00 to 12 00
Cast borings, net tons	9 00 to 9 50
Car wheels, net tons	16.50 to 17.00

CLEVELAND.

New Record Made in Chartering Ore.—Foundries Urging Shipments of Pig Iron.

OFFICE OF *The Iron Trade Review*,
Browning Building, December 20.

Iron Ore.—The breaknig of records in the ore business continues. Not only have the production and shipments for 1905 and the sales for 1906 been far in excess of those of any other year, but the chartering has already been done to an unprecedented extend for this time of the year. Although the Steel Corporation has not yet chartered any tonnage, it is estimated that vessels have been chartered to carry nearly 10,000,000 tons, and the chartering by the Corporation, which will amount to about 8,000,000 tons, is likely to be done at any time this week or next. The policy established in 1904 for chartering a very large percentage of all the ore to be shipped will be continued and the wild ore in 1906 will probably not exceed that of 1905, which was about 3,500,000 tons. The officials of the Steel Corporation are understood to be in harmony with other shippers who have chartered at the same rates as those of last year based on 75 cents from the head of the lakes. Although the damage caused by storms late in the season was not insignificant, the vessels lost beyond recovery were few, and the new tonnage which will be in commission soon after the opening of navigation will be far in excess of losses due to the storm. Another fact to be noted in this connection is that during the last three months of the season of navigation this year there were placed in commission new vessels, which, if they had been finished at the opening of navigation, would have been able to carry about 1,500,000 tons of ore in addition to that which they did actually carry. It is also true that some of the large freighters did not have all the business they could handle during some of the summer months. Hence, there is no fear expressed as to the ability of the vessels to transport all the ore that will be ready for shipment next year. The total ore movement by lake from the Lake Superior mines for the season just closed was 33,473,788 tons, of which the Steel Corporation shipped 18,779,374 tons. The shipments by ports for December and for the season were as follows:

Port	December 1904	December 1905
Escanaba	137,344	131,553
Gladstone		
Marquette	40,410	52,578
Ashland	18,422	25,224
Superior	37,926	75,151
Duluth	75,599	36,737
Two Harbors	56,670	80,701
	366,371	401,944
1905 Increase		35,573

Port	Season 1904	Season 1905
Escanaba	3,644,267	5,307,938
Gladstone	480	
Marquette	1,907,301	2,977,828
Ashland	2,288,400	3,485,344
Superior	4,169,990	5,118,385
Duluth	4,649,611	8,804,443
Two Harbors	4,566,542	7,779,850
	21,226,591	33,473,788
1905 Increase		12,247,197

The shipments by months were as follows: April, 1,193,173; May, 4,619,431; June, 4,999,451; July, 5,224,619; Aug., 5,009,382; Sept. 4,425,550; Oct., 4,257,009; Nov., 3,341,229; Dec., 401,944. The shipments by rail this year will amount to about 600,000 tons; so the total shipments for 1905 will be about 34,000,000 tons against 27,571,021 tons in 1902, which was the record year previous to 1905.

Pig Iron.—While the market is of course feeling the effect of the quiet conditions incident to the holiday season, business of considerable proportions is developing from an unusual and unexpected source. By reason of a melt much heavier than had been anticipated, many foundries which believed their requirements well covered until the first of the year and through the first quarter of 1906 are finding the estimates of their needs much too small and are already suffering. Producers and sales agents are receiving numerous requests for deliveries at once, anticipating on next year's contracts. Furnaces, however, are contracted to capacity and many short-handed foundrymen are being forced to pick up occasional odd lots at heavily advanced prices. Others are making use of Virginia iron, selling on a basis of $14.50 Birmingham, and are finding it a satisfactory substitute; the tonnage selling for this purpose is quite large. Except for orders of this sort, little business is being sought, but inquiries for deliveries through the early months of next year indicate a willingness to buy at prices now prevailing. Southern iron quotations continue to show considerable variance, but for any quantities No. 2 is firm at $14.50 with those interests which are sold well through the first half holding out for $15.00. The car shortage, which has worried coke shippers all fall, as now begun to affect the iron industry and one large producer in the Youngstown district reports great difficulty in moving his output. Coke continues the easier tone which it developed ten days ago with transportation facilities improved. Furnace coke is obtainable immediately at $2.85 to $2.90. For best foundry grades $4.00 is asked; a price of $3.75 may be obtained for contracts through the first half of 1906, but not through the first quarter. We quote f. o. b. Cleveland as follows:

Bessemer	$18.35
No. 1 Foundry	18.50 to 19.00
No. 2 Foundry	18.00 to 18.35
No. 3 Foundry	17.50 to 18.00
No. 2 Southern	17.85 to 18.35
Gray Forge	16.85 to 17.35
Gray Forge, Southern	15.85 to 16.35
Lake Superior charcoal	19.00 to 19 50

Finished Material.—The heavy demand continues in practically all lines. Specifications are extremely brisk; many contracts expire with the new year and orders are rushing in to fill them to the limit. Despite the general suspension of building forced by the advent of winter, structural materials are much sought; deliveries are good and contracted customers are being well taken care of, but mills are sold a half year ahead and chance requirements are difficult to fill. Light rails are obtainable in comparitively short time but are in good demand. Inquiries for heavy rails and other railway supplies are insistent and numerous; some particularly attractive business is being booked. Sheets continue to improve and the new prices are gradually being established; plates are strong with large producers sold well ahead, though spot deliveries are to be had at premiums. Bar iron is selling freely at the new quotations.

Old Material.—Light business is reported, the quiet holiday conditions prevailing in almost all lines. We quote, Cleveland delivery, as follows:

Old Iron rails	$25.00 to 26.00
Old steel rails (over 6 feet)	16.75 to 17.75
Old steel rails (under 6 feet)	17.00 to 18.00
Old car wheels	17.00 to 17.50
Steel boiler plate	14.00 to 15.00
Steel axles	21.00 to 22.00
Malleable iron (railroad)	16.50 to 17.50
Malleable iron (agricultural)	15.50 to 16.50
Heavy steel	17.00 to 17.50

We quote as follows, net tons:

No. 1 R. R. wrought	17.50 to 18.00
No. 1 busheling	15.00 to 15.50
No. 1 machine cast	13.75 to 14.25
Iron axles	23.00 to 24.00
Axle turnings	11.50 to 12.50
Wrought turnings (free from cast)	11.00 to 12.00
Grate bars	9.50 to 10.00
Pipes and flues	13.50 to 14.50
Tank iron	11.00 to 11.50
Hoop and band iron	8.00 to 9.00
Sheet iron	7.00 to 8.00
Wrought drillings	11.00 to 12.00
Stove plate	10.50 to 11.00
Cast borings	8.50 to 9.50

PHILADELPHIA.

Touch of Winter Weather Indicates that Traffic Troubles May be Expected.

Pig Iron.—So far as prices and general activity are concerned there has been practically no change from last week; but a touch of winter weather has served notice that the long fine autumn is gone and that hereafter snow-blocked tracks, traffic congestion and scarcity of cars must be reckoned with as market factors. Buyers, however having substantially all covered their needs for the first quarter, and many for the second quarter also, have shown no disposition to be alarmed or rush up prices, and the market has accordingly remained in the same firm but quiet condition that has marked the last two or three weeks. As both sides profess entire satisfaction with the situation no essential change is looked for until January at least is well advanced. In the mean time much careful attention is being given to the astonishing figures of the output of iron ore and the production of pig iron, which are appearing with the close of the year, in an effort to discover what 1906 is likely to bring forth. Low phosphorus iron is reported unusually scarce, and with its increasing use a price advance is expected before long. Basic is reported in such demand that the price has generally been marked up to $18 per ton. Comparatively few orders are reported during the week, but that was to be expected at this time of year. Prices may be quoted as follows:

No 1X Foundry	$19.00 to 19.25
No. 2X Foundry	18.50 to 18.75
No. 2 Plain	18.00 to 18.25
Standard Gray Forge	16.50 to 17.00
Basic	18.00 to 18.25
Low Phosphorus	24.00 to 24.50
Southern No. 2X, rail	18.50 to 18.75

Finished Material.—Bar iron continues a feature of the market, being quoted at 1.80c Pittsburg, but in other lines there is no notable change. Developments of the past fortnight regarding the requirements of the railroad make it practically certain that there will be no let-up in activity throughout the whole of 1906 in all the heavier lines. In the mean time the somewhat nominal figures that have prevailed for some time remain unchanged, as follows: Beams, channels and angles according to specifications, 1.82½c to 2.50c; refined iron bars, 1.75c to 1.85c; steel bars, 1.63½c to 1.83c; plates, 1.73½c to 1.83½c.

Old Material.—The quiet market shows one or two soft spots, but they are really unimportant, and there is practically no change in prices. The mills are not buying freely, and the yards are well stacked up for the winter. The following figures may be quoted:

Old steel rails	$18.25 to 18.50
No. 1 steel scrap	18.00 to 18.50
Old steel axles	21.50 to 22.00
Old iron axles	28.00 to 28.50
Old iron rails	23.00 to 24.00
Old car wheels	17.50 to 18.00
Choice scrap, R. R. No. 1 wrought	22.50 to 23.00
No. 1 yard scrap	20.00 to 21.00
Machinery scrap	16.50 to 17.00
Low phosphorus scrap	22.00 to 23.00
Wrought iron pipe	16.50 to 17.00
No. 1 forge fire scrap	61 50 to 17.00
No. 2 forge fire scrap, ordinary	13.25 to 13.70
Wrought turnings	14.50 to 15.00
Axle turnings, heavy	15 50 to 16.00
Cast borings	10.50 to 11.25
Stove plates	13.25 5c 13.75

NEW YORK.

Pig Iron Market Quiet but Strong with Prices about Stationary.—Heavy Tonnage of Basic under Negotiation.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., December 20.

Pig Iron.—The week has been comparatively quiet with a fair run of business, inquiries while not numerous being of good tonnage. The transactions in all grades in the local market make a total not far from 30,000 tons, of which about half involves basic and the other mill and foundry grades. The basic disposed of is the eastern product and it will be delivered to eastern steel mills. Sales of mill iron and gray forge aggregate some 7,000 tons divided into several lots. Transactions in foundry grades include 4,000 tons of No. 1 and No. 2 Alabama iron, which were distributed among the consumers of New England in small lots to make up unexpected requirements. These sales represent a portion of a quantity placed upon the market by the Sloss-Sheffield Steel & Iron Co., during the week. After forty-eight hours, when the books were again ordered closed, it was announced definitely that the company in question could deliver no more iron before July, 1906. Many foundrymen are melting more metal than expected earlier in the season, and are anxious to draw upon future deliveries in order to avoid buying at present prices. But consumption is apparently increasing daily, and the demand can scarcely grow less as the winter advances. Between 12,000 and 15,000 tons of foundry iron are now under negotiation, all of which will probably be closed during the present week. Steel makers are in the market for another 30,000 tons of basic iron which should also be accounted for before the end of the week. Pipe works have taken a large proportion of the mill and foundry iron sold, and are still in the market for more. The contract for several thousand tons of pipe for the New York water system mentioned in an earlier issue has not yet been placed. Prices have not changed materially during the week. The sales of Alabama iron referred to above were effected on a basis of $15.00 and $14.50. Birmingham. The following are prices at tidewater:

Northern No. 1 Foundry	$18.75 to 19.25
No. 2 Foundry	18.00 to 18.75
No. 2 Plain	17.50 to 18.00
No. 1 Southern Foundry	18.75
No. 2 Southern Foundry	18.25
No. 3 Southern Foundry	17.25 to 18.00
No. 4 Foundry	17.00 to 17.25

Pig Iron Certificates.—The market for certificates has been quiet and easy. Considerable changes in prices were made, and sales were few. Foundry iron warrants follow:

	Bid.	Asked.
December	16.50	17.25
January	16.50	17.25
February	16.60	17.00
March	16.80	17.00

Finished Iron and Steel.—December promises to be the record month of the year for finished steel. The capacity of the railroads to place rolling stock, bridges and rails is enormous. Notwithstanding the extraordinary orders placed during the past week, a number of heavy tonnages were sold within the last few days, and inquiries are still coming in.

The American Bridge Co. expects during the present month to add 50,000 tons to the immense amount of business which is already taxing the capacity of its mills. Although the bookings of the week were not heavy, the amount of business in sight is greater than last week. The railroads are inquiring for more bridge materials, among others the Tidewater railroad, which requires 17,000 tons. Bids for 8,000 tons of material for the New York Central terminal will be submitted today. The report that the contract for the Brooklyn elevated extension had been awarded is erroneous, the entire project being suspended indefinitely because of some question concerning the right of way. The continued scarcity of shapes is driving a number of smaller firms abroad for building material. Several hundred tons, chiefly in small lots, were recently imported from Germany and Belgium. The local strike among the structural steel workers is today declared to be practically at an end, the contractors having secured sufficient men to complete the work under construction.

Plates are enjoying a good demand, and the question of an increase in prices is likely to come up for another consideration in the near future.

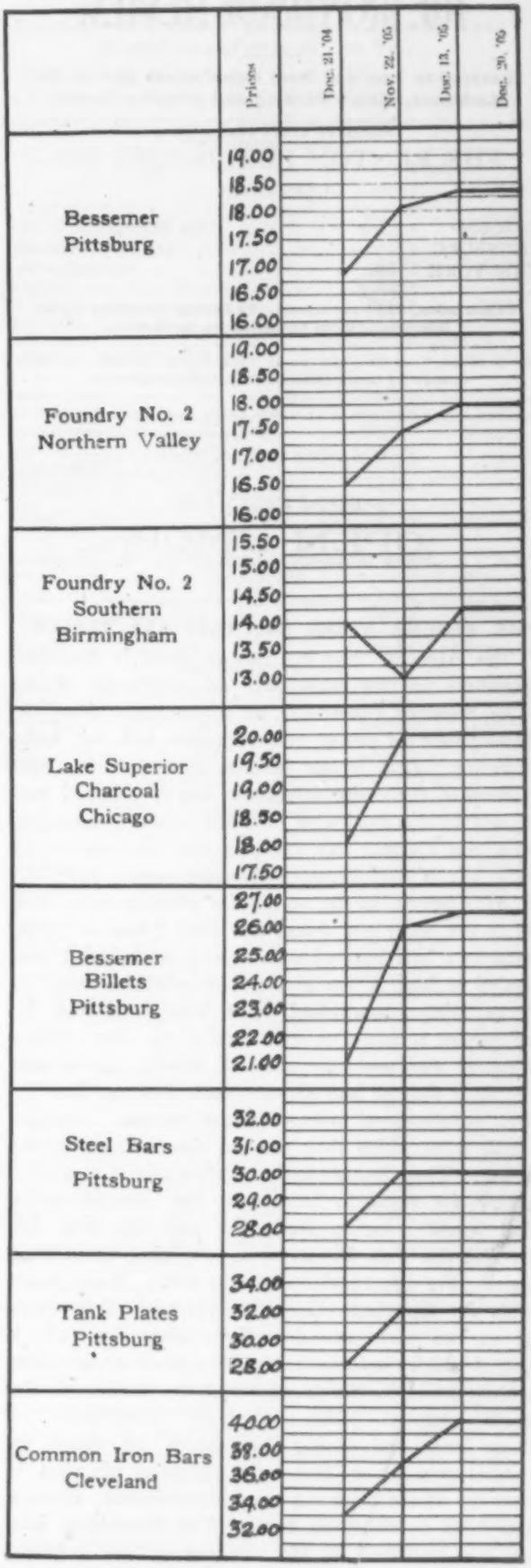
Bar iron has been strong with moderate trading at maximum prices. Orders for tin plates for shipment after the beginning of the year are increasing.

The following are prices at tidewater: Angles, 3 to 6 in. x ¼ in. and heavier, 1.84½c; beams, 3 to 15 in., 1.84½c; tees, 3 x ¼ in. and heavier, 1.89½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine and ordinary fire box, 1.94½c; refined iron bars, 1.84½c; soft steel bars, 1.64½c to 1.79c; sheets in carload lots New York, black, 2.40c.

Old Materials.—There has been little or no new business during the week but the movement of stock on old contracts is considerable. Prices continue firm, the slack demand having no appreciable effect on values. There is a feeling in the trade that business will be brisk after the holidays. Inquiries for heavy melting scrap have been going the rounds but there have been few sales. Wrought yard scrap is perhaps receiving the least attention of the various stocks on the market. The following are prices at tidewater approximately:

Old iron rails	$21.00 to 22.00
Old steel rails, long lengths	15.50 to 16.00
Old steel rails, short pieces	15.00 to 15.50
Relaying rails	23.00 to 24.00
Old car wheels	16.00 to 16.50
Old iron car axles	24.00 to 25.00
Old steel car axles	19.00 to 19.50
Heavy melting steel scrap	15.50 to 16.00
No. 1 railroad wrought scrap	20.00 to 21.00
Iron track scrap	18.50 to 19.50
Wrought pipe	14.00 to 15.00
Cast borings	10.00 to 10.25
Wrought turnings	14.50 to 15.50

PRICE CHART.



THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

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THE ALGOMA STEEL CO., PAST AND PRESENT.

The Algoma Steel Co. whose plant is described elsewhere in this issue, was an outgrowth of the Lake Superior Power Co., an afterthought from the development of power at the eastern end of Lake Superior. That it has become the most important portion of the entire scheme is due to changed conditions in the northwest and the recent tremendous step that Canada has made in the consumption of rails. It is slightly more than ten years since Mr. F. H. Clergue, in the search for water power, landed at the Sault and found the small Canadian canal, used in a half hearted sort of way, with what appealed to him as the greatest possibilities out of doors lying untouched. The history of that development is more or less familiar to the public. First it was with the idea of making power and selling it that he and his associates took up their initial development and built the present Canadian canal, from which they secured about 20,000 horsepower. They found that to utilize this it was necessary for them to introduce the manufactories that would consume the power and this they did. At first the wide forests of spruce lying about their doors gave the reason for pulp mills, then came mills for the electro-chemical industries, then shops of various sorts and then the construction of a railroad and a colonization scheme upon an immense scale, based on the acquirement of lands in the north country. This caused an examination of those lands and during that search for values an outside prospector found the outcrops of what is now the Helen mine, of the Michipicoten district, 100 miles north of the Sault. This deposit of iron ore was reported to Mr. Clergue by his technical associates and by government engineers as far more important than it has since proved to be, and the Algoma Central railroad was built to it with that excessive energy that has been one of his distinguishing characteristics. To utilize what was said to be an almost inexhaustible supply of iron ore, blast furnaces and steel mills were planned and work on them begun. In the elucidation of his plans for the elimination of wastes, it was proposed that the forests of hardwoods along the company's roads should be used as fuel for smelting these ores, and one furnace was planned to be for charcoal iron. Canada and the mother country were to be the market for the company's product, which was to include a nickel steel made from the company's hematite and pyrrotites, the latter from its mines in the Sudbury region.

These furnaces were begun four years ago, and up to that time there had been no lack of money for the vast enterprises under construction. There was, however, a cessation of new enterprises and a sort of stock taking time throughout the country. The blast furnaces were to be completed by a certain date, but nearly a year passed before they were ready. This fact, combined with other causes closely connected with the condition of the country in 1903 and the serious troubles of the Pennsylvania road, many of whose leading stockholders were the financial sinews of the Lake Superior Co., checked the flow of money into Mr. Clergue's hands.

It was not a house of cards he had builded, but owing to the incomplete condition of nearly every one of the many enterprises of the Sault, it fell like one. The collapse was complete and startling. The twenty-five to twenty-eight million dollars put into these enterprises by Philadelphia people was almost wiped out, and if certain scheming bankers had been successful in their machinations, would have been entirely lost. The plants would have sold for the mortgage bonds. But the Canadian government came to the rescue, stockholders who could do so assisted and the company was reorganized without Wall street assistance.

At the present time, the rail mills and furnaces are the chief industries of the affiliated companies, but the railroad is in successful operation and is to be extended into more timber and on toward the north country; the paper and pulp enterprises are in process of extension; the wood working industries are very successful and will be maintained, and other subordinate concerns are in good shape. The Sudbury mines are idle and the projects for nickel steel and the conversion of pyrrotites and the saving of their sulphur have been dropped, some of them probably for all time. The engineering botch of the American water power canal, which was a sore blow to Mr. Clergue, and came at just the time to accentuate the company's difficulties, is being worked out, and repairs are to be made that will

permit the use of the full theoretical power. This canal has cost the company more millions than it cares to state, and there was no excuse for the miserable engineering failure made there.

The Algoma Steel Co. is today ably managed and its prospects are more favorable than at any time in its history. The one great problem before it is how to obtain ample ore supplies. The Helen mine will produce about 200,000 tons this year, but its ore is not of Bessemer grade.

OBITUARIES.

Henry E. Weaver, president of the Weaver Coal & Coke Co., Railway Exchange building, Chicago, dropped dead while eating his dinner with his family Sunday, December 17.

Maurice Griffin, who has for the past six years been foreman of the Toledo Foundry & Machine Works, died at his residence in Toledo, on November 23. Mr. Griffin was 59 years of age and had lived in Toledo all his life.

James M. Pearson, hardware puchasing agent for the American Felt Co., died suddenly Dec. 2, at the age of 46. Mr. Pearson had been connected with the hardware trade for more than 25 years, and had won a high reputation for his good judgment.

Joseph Porter Barnes, vice president of the W. F. & John Barnes Company, and sup't. of its factory, Rockford, Ill., died Dec. 10 from typhoid fever. He was 31 years of age and secured his technical education at Cornell and the University of Wisconsin.

William J. Clizbe, manager of the Chicago branch of the Studebaker Brothers' Manufacturing Co. for seven years, died suddenly in South Bend, Ind., Sunday, December 17. Prior to entering the employ of this company, Mr. Clizbe was manager of the Chicago branch of the Milburn Wagon Company.

Philip W. Southgate, formerly examiner of patents in the Patent Office, and recently of the firm of Southgate & Southgate, patent lawyers, Worcester, Mass., died Dec. 6, at the age of 37. He was graduated from the Worcester Polytechnic Institute and from the National University, and was well known among machine tool manufacturers for his work in several important trials.

George M. Hinkley, manager of the saw mill department of the Allis-Chalmers Co. since the organization of that branch by the E. P. Allis Co. in 1873, died Dec. 14, at the age of 75. He was born in Seneca, N. Y., engaged in carpenter work until the civil war, and on his liberation from Andersonville, returned to Muskegon, Mich., where he became a millwright. In 1870 he went to Milwaukee and began the manufacture of saw mill specialties, three years later entering the employ of the Allis Co. Much of the machinery of the saw mill department of the Allis-Chalmers Co. is manufactured under patents of Mr. Hinkley.

Richard W. Jones, one of the best known business men and manufacturers of Syracuse, N. Y., died at his home in that city Dec. 1, at the age of 78. He was of English birth, but came to this country when a boy, and became interested in the manufacture of saddlery and harness hardware through securing employment with Hayden & Holmes, for whom he managed their department in the Auburn prison for some years. In 1855 he formed the firm of Olmsted & Jones, to manufacture saddlery hardware, and in 1877 became connected with Frazer & Barnes in the same business. Five years later the present firm, Frazer, Jones & Co., was organized. Mr. Jones was prominent in advancing the interests of Syracuse. He was one of the organizers, and an early president of the Citizens' Club, which now has a membership of 1,200.

LAKE SUPERIOR IRON MINES.

Shipments of the Steel Corporation Mines by Lake Greatly Exceed those of Last Year.

Shipments by lake of 1905 for the Oliver Iron Mining Co., a constituent company of the U. S. Steel Corporation, as compared with 1904, are as follows, by mines:

Mine.	Tons. 1905	1904
MENOMINEE RANGE.		
Aragon	423,261	374,944
Chapin	902,628	541,324
Columbia	27,883	.....
Mansfield	38,584	79,173
Michigan	58,233	.....
Riverton	82,611	81,543
Iron Ridge	37,233	.....
Total	1,570,433	1,076,984
MARQUETTE RANGE.		
Bessie	21,879	.....
Hartford	322,364	179,980
Lake Superior	729,192	590,339
Queen	253,376	311,479
Volunteer	106,281	71,870
Champion	64,680	174
Total	1,497,772	1,153,842
GOGEBIC RANGE.		
Atlantic	208,039	77,224
Aurora	541,223	212,920
Norrie	987,590	618,638
Tilden	192,203	204,581
Total	1,929,055	1,113,363
VERMILLION RANGE.		
Chandler	365,739	422,162
Pioneer	653,682	505,432
Savoy	342,095	74,866
Soudan	205,002	70,713
Zenith	109,818	86,557
Total	1,677,236	1,159,730
MESABI RANGE.		
A-Burt	1,861,680	1,415,884
Clark	358,869	256,873
Chisholm	232,733	130,732
Glen	289,559	280,412
Hull	233,775	.....
Monroe	13,730	.....
Tener	58,136	.....
Morris	1,071,316	.....
Myers	188,627	.....
Pillsbury	162,058	.....
Rust	272,451	.....
St. Clair	61,792	26,748
Sellers	262,205	207,990
Adams	1,140,984	940,105
Duluth	142,172	149,819
Fayal	1,358,922	975,102
Genoa	281,081	141,250
Spruce	606,295	589,319
Mountain Iron	2,500,570	1,168,855
B-Virginia	402,224	5,305
Higgins	239,435	35,286
Stephens	366,264	.....
Total	12,104,878	7,426,670
Total all mines	18,779,374	11,930,599

A—Includes for 1904: Rust, Hull, Burt. B—Includes for 1904: Oliver, Ohio

Announcement is made by Chairman Gary, of the United States Steel Corporation, that its employes and those of its subsidiary companies will be given opportunity to subscribe at about par for the preferred stock of the corporation for 1906. This is at practically the same reduction from the current quotation, as was contained in the offer of a year ago, when the stock was sold to employes at $87.50, the current market quotation being about $93. Last year nearly 8,500 employes subscribed for about 18,000 shares, and the market value of the total holding of employes is near $10,000,000.

TWENTY-FIFTH ANNIVERSARY

Celebrated by Rogers, Brown & Co. at Cincinnati.—A Record of Steady Growth.

During Dec. 13, 14 and 15 Rogers, Brown & Co. held in Cincinnati a meeting of the firm members, resident managers and other representatives to commemorate the twenty-fifth anniversary of the founding of the firm. It was by far the largest, most representative and enthusiastic gathering the company has ever held, and as it marks an epoch in the history of this leading pig iron house, it becomes an event of unusual interest.

The original firm, Rogers & Trivett, formed in November 1880 by Wm. A. Rogers and Robt. C. Trivett, is actually the beginning of Rogers, Brown & Co., Mr. Archer Brown becoming associated with Mr. Rogers a year later, after Mr. Trivett's death. The history of Rogers, Brown & Co. since that time is a record of constant growth and expansion which has been marked at intervals by the entering into the partnership of D. B. Meacham, M. C. Armour and W. C. Herron. Mr. Herron retired a few years ago because of loss of health. Mr. A. A. Fowler entered the firm in 1904, and a year ago, shortly after Mr. Brown's death, the present partnership was completed by E. L. Billingslea, W. T. Shepard and J. K. Pollock. A sketch of the history of the firm was published in *The Iron Trade Review*, Aug. 31, 1905.

Dec. 13 the partners of the firm held their annual meeting and on Thursday the resident managers and salesmen from out of town began to arrive. Thursday noon the company, numbering thirty, dined at the Queen City Club. The menu, being rather an unusual one, is given herewith:

Huitres, demi Limestone
Filets Salisbury, with fresh shot iron
72-hour crushed egg plant, hard blown
Oriskany potatoes a la silvery
Lettuce, cold blast
Furnace Scrap, Slag timbale
Fromages, high sulphur
Cafe maitre de foundry
Cigars
(Rogerique, Brownello et Cie)

During the course of the dinner and afterward, under Mr. D. B. Meacham as toast-master, the following toasts were responded to:

Welcome.....D. B. Meacham.
"I charge thee, invite them all, let in the tide
Of braves once more; my cook and I'll provide."
Shakespeare.

Response.....C. A. Stillman.
"A curse begin at every root of his heart that is
Not glad to be here." Aristotle.

How to Increase Our Coke Business.
.....G. P. Bassett, Jr.
"His years but young, but his experience old;
His head ungarnished, but his judgment ripe."
Pope.

Getting New Business.....J. C. Mears.
"Of all the horrid, hideous notes e'er taught,
Sadder than owl-songs or the midnight blast,
Is that portentous phrase, 'I have just bought'."
The Knight of the Grip.

How to Induce Buyers to Use Special Irons.
.....Harwood Wilson.
"A persuasive tongue is more to be envied
than great riches." The Koran.

Loking Backward Twenty-five Years.
.....W. A. Rogers.
"Lull'd in the countless chambers of the brain,
Our thoughts are linked by many a hidden chain,
Awake but one, and lo! what myriads rise!
Each stamps its image as the other flies."
Rogers: Pleasures of Memory.

Looking Forward Twenty-five Years.
.....A. A. Fowler.
"If you can look into the seeds of time
And say which grain will grow and which will not,
Speak then to me." Roosevelt.

Mr. Rogers's address was one of great interest to all present. He traced the beginning of the firm and its embarkation on the then unknown road which it has so successfully traveled, and described the earlier life and experiences of the young men who later associated themselves in the company. A note of sadness was occasioned by the absence of Mr. Brown, who, had he lived, would have been one of the leading spirits in the present reunion. Mr. Rogers made the occasion one for personal tribute to Mr. Brown, whose death occurred about a year ago, and with whom he had been associated so intimately since early manhood. He spoke out of the fullness of his heart as he traced the personal character and business attainments of his friend, and showed how the integrity and high character of Mr. Brown was always present in his home life and business dealings. For the benefit of the younger men present, he stated that no better example of business rectitude could be held before them in the performance of their duties with the company and elsewhere during their life. He dwelt especially on the chaarcter of the firm as it has been molded by Mr. Brown, and paid a tribute to him when stating that the company's present high regard in the business world was the direct result of this influence by him and on his associates. Mr. Rogers's talk was an inspiration to all present, and while many of the recollections which the meeting doubtless brought back to Mr. Rogers may have been sad ones, it was fitting that the qualities which have so long marked the firm of Rogers, Brown & Co., should be commented upon and one of their strongest upholders honored.

Thursday evening Mr. Meacham entertained the company at his home in Avondale. The meeting was for mutual exchange of ideas and was a most informal and delightful gathering. The Rogers, Brown & Co. Glee Club, formed on the spot, rendered many choice selections.

On Friday the visitors were entertained at luncheon at the Business Men's Club, when there was a further and informal discussion of plans and methods for the following year. Friday afternoon saw the departure of a number of the party and the end of the meeting, which had been not only a benefit in a business way but also a source of pleasure and new acquaintances on the part of all. Those present during the three days were the following: W. A. Rogers, D. B. Meacham, M. C. Armour, A. A. Fowler, W. T. Shepard, E. L. Billingslea, J. K. Pollock, Robert Gilchrist, G. R. Sullivan, S. W. Hubbard, Harwood Wilson, G. P. Bassett Jr., Jas. R. Darragh, H. W. Fernald, J. C. Mears, F. W. Bauer, C. A. Stillman, F. I. Foote, F. C. Wright, H. E. Frazier, E. McBirney, H. E. Turner, W. D. Patton, F. W. Miller, Geo. W. Douglas, A. J. Wentworth, H. B. B. Yergason, R. D. Meacham, W. P. Hanson and Phillips Isham.

Mr. C. H. Zehnder, resident manager in Philadelphia, was the only absentee, being kept in the East on account of important business engagements which it was impossible to change.

The American Sheet & Tin Plate Co. expects to put its Humboldt works at Connellsville, Pa., in operation about Jan. 8. The plant has an annual capacity of 13,500 gross tons, its product being tin and terne plates.

Thompson McCosh, president of the McCosh Steel Co., Burlington, Iowa, is interested in the forming of a new city to be called Ferrodale. The new town will probably become a steel center in that part, as plans are on foot to establish a plant and other industrial works as soon as possible. A tract of 1,400 acres on one side of which runs the Santa Fe Railroad will be used for the site.

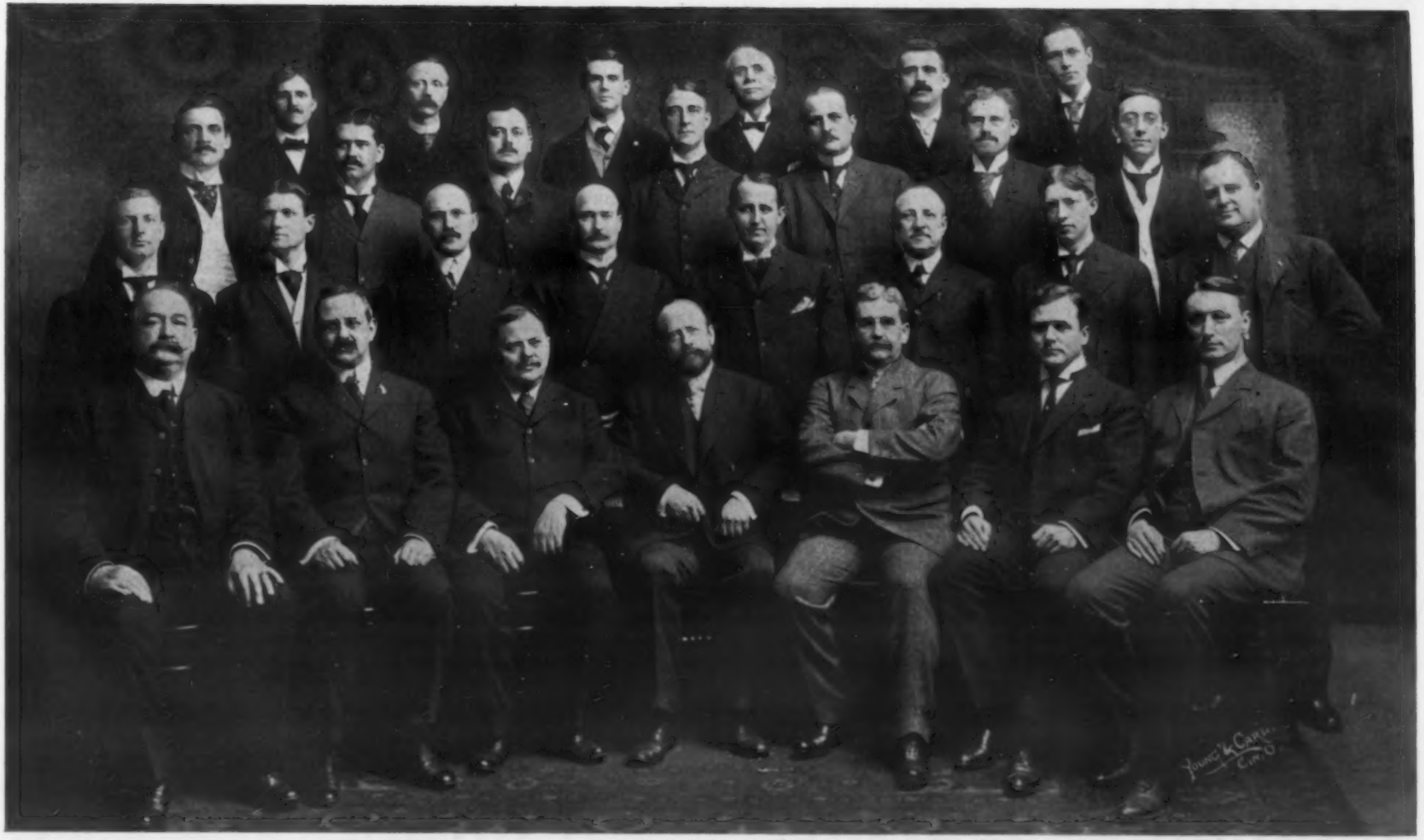


Photo by Young & Carl, Cincinnati.]

ROGERS, BROWN & CO.

TWENTY-FIFTH ANNIVERSARY MEETING, CINCINNATI, DEC. 13-14-15, 1905

H. E. FRAZIER, Cincinnati
H. E. TURNER, Cincinnati
F. W. BAUER, St. Louis
F. I. FOOTE, Chicago
E. McBIRNEY, Cincinnati
H. B. B. YERGASON, Cincinnati
F. C. WRIGHT, Cincinnati
H. W. FERNALD, Boston
J. C. MEARS, St. Louis
PHILLIPS ISHAM, New York
ROBERT GILCHRIST, New York
W. P. HANSON, Bluefield
A. J. WENTWORTH, Cincinnati
S. W. HUBBARD, Cleveland
C. A. STILLMAN, Birmingham
F. W. MILLER, Cincinnati
G. P. BASSETT JR., Pittsburg
G. R. SULLIVAN, Philadelphia
J. R. DARRAGH, Pittsburg
HARWOOD WILSON, Cleveland
J. K. POLLOCK, Cincinnati
W. T. SHEPARD, Buffalo
D. B. MEACHAM, Cincinnati
W. A. ROGERS, Buffalo
M. C. ARMOUR, Chicago
A. A. FOWLER, New York
E. L. BILLINGSLEA, Chicago

Advances Recorded by Active Stocks.

An erratic market with feverish, intermittent trading extremely heavy in the aggregate and with a general upward tendency in prices of the most active securities, despite considerable liquidation by various pools, occupied the attention of Wall street during the past week. The sales for the six days totaled 8,872,800 shares, an average of 1,478,800 daily. A sagging tendency toward the last of the week lost something of advances recorded, which in the case of a number of railway stocks and industrials generally outside the iron and steel field were to levels near the highest ever quoted, the more important securities averaging 30 points above the prices of a year ago. As in the previous week the manipulators of the market found little difficulty in overcoming a number of discouraging features. The market paid practically no attention to a revival at European financial centers in the weakness of Russian securities,—in fact Russian affairs appear to be disregarded generally on Wall street,—and was almost equally indifferent to the advance of the Imperial Bank of Germany's exchange rate to six percent, a point reached only three times in a century. Secretary Shaw's offer to prepay on Dec. 15 the interests due on United States bonds the first of the year was taken advantage of to the limit and speculation was as wild as for the past month. Union Pacific sold almost 1,400,000 shares, Amalgamated Copper, 865,700; Smelter, 472,000; Reading, 462,200; Southern Pacific, 442,100 and Steel common 599,000 In all, 18 stocks sold over 100,000 shares, Steel preferred and common being in the list. Of the strictly iron, steel and allied securities, which are listed in the accompanying table, eleven were dealt in past the 15,000 share mark, American Locomotive, Republic Iron & Steel and Tennessee Coal & Iron being the leaders. Experienced traders view the situation with more or less suspicion and predict a general break in prices when the many pools now operating attempt to unload any great part of the mass of securities they have accumulated.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quotation Dec 9	Closing Quo. Dec. 16	Changes	Date of 1905 Ann. Meet.	Par Value	Capital Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Dec.
Allis-Chalmers Co	23⅞	21⅝	−1⅜	Sept.	100	19,820,000			
Allis-Chalmers preferred	65½	62	−3½		100	16,150,000	7 cum		Feb., 1904
AmericanCan	8⅞	9⅛	+ ¼	Feb.	100	41,233,300			
AmericanCan preferred	70¾	68½	−1¾		100	41,233,300	7 cum	5 Q.	Jan., 1906
AmericanCar and Foundry	41	40	−1	June 29	100	30,000,000			May, 1905
AmericanCar and Foundry preferred	102	98⅝	−3⅜		100	30,000,000	7 n. c.	7 Q.	Jan., 1906
AmericanLocomotive	69¾	68½	−1¼	Oct. 17	100	25,000,000			
AmericanLocomotive preferred	117	116⅝	− ⅜		100	24,100,000	7 cum	7 Q.	Oct., 1905
AmericanShipbuilding	56½	58	+1½	Oct. 4	100	7,600,000	4	4 Q.	Dec., 1905
American Shipbuilding preferred	104	105	+1		100	7,900,000	7 n. c.	7 Q.	Oct., 1905
American Steel Foundries	13⅞	13½	− ⅜	Oct. 3	100	17,700,000			
American Steel Foundries preferred	49½	47⅜	−2⅛		100	17,700,000	6 cum		Aug., 1904
Barney & Smith	18	22⅝	+4½	June 6	100	1,000,000			June, 1893
Barney & Smith preferred	125	128	+3		100	2,500,000	8 cum	8 Q.	Dec., 1905
Bethlehem Steel	34	32½	−1½	April 4	100	15,000,000			
Bethlehem Steel preferred	90	89½	− ½		100	15,000,000	7 n. c.	7 Q.	Nov., 1905
Bullock Electric preferred	114	112⅞	−1⅛	Oct. 1	100	1,000,000	6	6 Q.	Oct., 1905
Cambria Steel	28½	28¾	+ ⅜	March 21	50	45,000,000	6	3 S. A.	Aug., 1905
Cambria Iron	49	49	.....		50	8,408,000	4	4 S. A.	Oct., 1905
Colorado Fuel & Iron	47⅛	53½	+6	Oct. 16	100	30,132,000	7	.....	Apr., 1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	25	25	.....	May 25	100	6,098,000	5	.....	Nov., 1902
Crucible Steel	13⅜	13⅝	+ ⅜	Oct. 18	100	25,000,000			
Crucible Steel preferred	67¾	69¼	+2		100	25,000,000	7 cum	.....	Sept., 903
Empire Steel	6	7	+1	Feb. 22	100	2,281,400			
Empire Steel preferred	35	39	+4		100	2,500,000	6 cum	3 S. A.	Jan., 1901
Fay & Egan	90	90	.....	Feb. 21	100	1,000,000	5	5 Q.	Nov., 1905
Fay & Egan preferred	120	120	.....		100	1,000,000	7 cum	7 Q.	Nov., 9055
General Electric	184½	175	−8½	May 9	100	48,256,050	8	8 Q.	Oct., 1905
International Pump	27	27	.....	June 6	100	12,262,500		2	July, 1905
International Pump preferred	82	80¾	−1¼		100	8,850,000	6 cum	6 Q.	Nov., 1905
Lackawanna Steel	81	81	.....	March 8	100	34,971,400			
Lake Superior Corporation	17	17½	+ ½		100	40,000,000			
Niles-Bement-Pond	121	121	.....	Feb. 1	100	5,000,000	6	6 Q.	Sept., 1905
Niles-Bement-Pond preferred	103⅝	103⅜	.....		100	2,000,000	6 cum	6 Q.	Nov., 1905
Otis Elevator Co	60	60	.....	March 20	100	6,350,300		2 A.	Apr., 1905
Otis Elevator Co. preferred	107	107	.....		100	5,589,500	6 n. c.	6 Q.	Oct., 1905
Pittsburg Coal Co	14½	15¾	+1¼	Feb. 11	100	30,135,000			
Pittsburg Coal preferred	56	62¾	+6¾		100	30,716,200	7	.....	Apr., 1905
Pressed Steel Car	57⅞	55¼	−2⅛	Feb. 15	100	12,500,000	3		Aug., 1904
Pressed Steel Car preferred	90⅜	99½	− ⅞		100	12,500,000	7 n. c.	7 Q.	Nov., 1905
Pullman Palace Car	242	245	+3	Oct. 19	100	74,000,000		8 Q.	Nov., 1905
Railway Steel Spring	62¼	60	−2¼	March 2	100	13,500,000		4 S. A.	Oct., 1905
Railway Steel Spring preferred	103	103	.....		100	13,500,000	7 cum	7 Q.	Dec., 1905
Republic Iron & Steel	35½	33⅛	−2	Oct. 18	100	27,352,000			
Republic Iron & Steel preferred	105¼	104½	−1⅜		100	20,852,000	7 cum	7 Q.	Jan., 1906
Sloss-Sheffield	90⅝	90	− ⅝	March 15	100	7,500,000	5	5	Oct., 1905
Sloss Sheffield preferred	112	110	−2		100	6,700,000	7 n. c.	7 Q.	Oct., 1905
Tennessee Coal & Iron	135½	143	+7½	May	100	22,552,800		4 Q.	Nov., 1905
U. S. Cast Iron Pipe & Foundry	46½	45	−1½	June 28	100	12,500,000		1	Dec., 1905
U. S. Cast Iron Pipe & Foundry preferred	94⅓	93	−1⅓		100	12,500,000	7 n. c.	7	Dec., 1905
U. S. Steel	37¼	38⅛	+ ⅞	April 17	100	508,302,500		.....	Dec., 1903
U. S. Steel preferred	104½	105⅛	+ ⅝		100	360,281,100	7 cum	7 Q.	Nov., 1905
U. S. Steel 5's	96⅜	96⅝	+ ¼		100	463,798,000	5	5 A.	
Virginia Iron, Coal & Coke	52¼	50¼	−2	Sept. 19	100	8,641,600		.....	
Westinghouse Electric	172	175	+3	June 28	50	20,990,350	10	10 Q.	Oct., 1905
Westinghouse Air Brake	157½	155	−2½	Oct. 3	50	10,990,450	20	20 Q.	Oct., 1905

Recent dividend declarations include the following: Empire Steel & Iron Co., semi-annual 1½ percent on preferred, payable Jan. 1; Central Coal & Coke Co., regular quarterly 1¼ percent on preferred and 1½ percent on common stock, payable Jan. 15; Otis Elevator Co., regular quarterly, 1½ percent on preferred stock, payable Jan. 15; Westinghouse Air Brake Co., regular quarterly 2½ percent with an extra dividend of 2¾ percent payable Jan. 10; American Shipbuilding Co., regular quarterly, 1¾ percent on preferred stock, payable Jan. 15; American Nut & Bolt Fastener Co., extra dividend of 6 percent, payable Dec. 20; Westinghouse Machinery Co., regular quarterly, 2½ percent, payable Jan. 10; United Shoe Machinery Co., regular quarterly, 2 percent on common and 1½ percent on preferred, payable Jan. 15.

REPUBLIC INTERESTS

HAVE ACQUIRED CONTROL OF THE TENNESSEE COAL, IRON & R. R. CO.

Announcement Made That There Will be Important Improvements.—The New Directors.

At a meeting of the directors of the Tennessee Coal, Iron & Railroad Co., held at New York Tuesday Dec. 19, the make-up of the board of directors and of the executive committee was so radically changed as to amount to a reorganization with John W. Gates of the Republic Iron & Steel Co. at the head of the executive board. The old directors of the Tennessee Co. who remain on the board are: D. H. Bacon, who continues as chairman of the board of directors, F. S. Witherbee, first vice president, L. T. Beecher and S. L. Schoonmaker. The newly chosen directors are: S. G. Cooper, and C. S. Guthrie, respectively president and chairman of the executive committee of the Republic Company, L. C. Hanna, E. W. Oglebay, Grant B. Schley, John W. Gates, E. J. Berwind and Oakleigh Thorne. With the exception of the last named, all of these are directors of the Republic Iron & Steel Co. The new executive committee consists of John W. Gates, C. S. Guthrie, G. B. Schley, L. C. Hanna, E. W. Oglebay, D. H. Bacon and S. L. Schoonmaker, two old members and five members of the Republic board.

New Interests in Control.

At the close of the meeting the following statement was issued by Mr. Guthrie: "The new interests entering the board of the Tennessee Coal & Iron are in absolute control of the property. We have bought control of the corporation with the object of developing it and bringing the property up to its highest degree of efficiency. Considerable money will be spent for extension and improvements. As to a merger of Tennessee Coal & Iron with the Republic Iron & Steel Co., that is a question of the future."

The regular quarterly dividend of 1 percent on the common and 2 percent on the preferred stock was declared. The Tennessee Co. has outstanding $248,000 of preferred stock and $22,553,060 of common. The market price of its securities has recently reached the highest level in its history on rumors of a prospective merger, in which current reports had it that the Sloss-Sheffield Steel & Iron Co. was to be included.

The new directory board re-elected Dan H. Bacon, president, and L. Hoover, secretary and treasurer, selecting H. Dewart as assistant secretary and treasurer in place of H. R. Sloan, deceased.

The properties of the Tennessee Coal Iron & Railroad Co., which are confined to Alabama, Georgia and Tennessee, include 17 blast furnaces with an annual capacity of various grades of iron of over 1,100,000 tons, rolling mills at Bessemer, Ala., and steel works and a steel casting plant at Ensley, Ala., with an annual capacity of 350,000 tons of steel ingots, 12,000 tons of steel castings, from 150,000 to 300,000 tons of rails or billets and 60,000 tons of other rolled and finished products. Its other holdings in these three states includes 304,000 acres of coal land, 39,000 acres of iron ore land, 69,000 acres of undeveloped mineral land, and 29,000 acres of miscellaneous timber and other land, a grand total of 441,000 acres.

The Republic Iron & Steel Co. has in operation or nearing completion eight blast furnaces with an annual capacity of 775,000 tons, its rolling mills and steel works, which number more than a score, have an annual capacity of 500,000 gross tons of Bessemer steel ingots, 35,000 open hearth steel ingots, 450,000 tons of Bessemer steel blooms and billets, 120,000 kegs of cut nails, 23,000 tons of spikes, and 1,200,000 tons of finished bars, bands, rails, channels, angles, plates, etc. It also owns extensive mining lands in the Lake Superior region. Its southern properties include 3 blast furnaces with 270,000 tons annual capacity, rolling mills and steel plants at Gate City and Birmingham, Ala., some 26,000 acres of red and brown ore and coal lands in Alabama with well-producing mines in operation. The company is well supplied with coke and limestone properties.

Sloss-Sheffield Reports.

In this connection it is announced that at a meeting this week of the directors of the Sloss-Sheffield Steel & Iron Co., M. M. Richey, now assistant general superheadquarters in Birmingham, was elected first vice-president of the Company, the new official to succeed Joseph Bryan, of Richmond, Va., who has resigned. Mr. Richey is a friend of President J. C. Maben, of the Sloss-Sheffield Company and he is to relieve that official of considerable of the strain of the office and will look after the outside work. There will be but little, if any disturbance of duties now performed by the second vice president, J. W. McQueen.

PERSONAL.

E. J. Slatjback has been elected a director in the Carbon Steel Co., succeeding Archibald B. McGrew.

W. A. Moyer has been chosen industrial agent of the Delaware & Hudson Co., with offices at Albany, N. Y.

L. C. Biehler, traffic manager of the Carnegie Steel Co., has been chosen president of the Pittsburg Traffic Club.

C. M. Bradley, formerly assistant in the purchasing department of the International Harvester Co., Chicago, has resigned.

Mr. Nat H. Ashley, of the Robert Field's Sales Agency, fell from a traction car near Jackson, Ohio, sustaining painful injuries.

Mr. F. M. Eaton, resident partner of Hickman, Williams & Co. in Cincinnati, left about December 15 for a stay of several months in the West.

J. H. Plummer, president of the Dominion Iron & Steel Co., is now in Europe, where he will spend some time in an effort to recuperate his health, which has been endangered by too close attention of late to business duties.

S. Owen Livingston, manager of the foreign department of the Fox Machine Co., Grand Rapids, Mich., has returned from an 11 weeks' trip to Europe in the interests of his company. While abroad he visited all the leading cities of England and the continent.

T. M. Simpson has been made district sales manager of the Weber Steel Concrete Chimney Co., Chicago. He will be located at 1632 Land Title Bldg., Philadelphia, in which city he has been for several years as manager of the Philadelphia office of A. D. Granger & Co.

A. J. Hill has been appointed superintendent of the foundry department of the Anaconda Copper Mining Co., of Anaconda, Montana, to succeed J. S. Hickey, who recently resigned. J. S. Goodwin is to be ass't. superintendent. Both Mr. Hickey and Mr. Goodwin have grown up in the department, which was formerly known as the Tuttle Works.

Thomas Morris has resigned as iron tester for the Springfield Malleable Iron Co., Springfield, O., after a service there of a third of a century. He is the inventor of a process for the manufacture of malleable iron, having made a study of that trade in Scotland before coming to America.

IMPORTANT PURCHASE

Made by W. P. Snyder of Pittsburg—Oliver Ore and Other Interests Taken Over.

W. P. Snyder of Pittsburg, has purchased the Oliver interests in the firm of W. P. Snyder & Co., in the Shenango Furnace Co., and in the ore, limestone, furnace and vessel properties. The ore purchased does not of course, include any of the holdings of the Oliver Iron Mining Co., but it covers 40 million tons on the Mesabi range in St. Louis county, Minn., and 12 million tons on the Marquette range in Dixon county, Mich. The coal property consists of twelve thousand acres in the Connellsville region. One freighter is being built for the Shenango company and it is just announced that two more are to be ordered at an early date. The four furnaces are at Sharpsville, Pa.

SALE OF ORE FIELDS DENIED.

(Special Telegram.)

Minneapolis, Minn., Dec. 20.—Louis Hill brands as an absolute falsehood the widely circulated report that the iron ore interests of James J. Hill and his associates on the Mesabi range, have been transferred to the United States Steel Corporation.

The Metal Market.

CHICAGO.

There is an insistent demand for metals and prices are reaching to unprecedented heights. Copper has advanced three cents during the week, and it is now quoted higher than ever before in the history of the industry. Pig tin has also moved up two cents a pound, and spelter a quarter of a cent. Antimony and lead are also higher. Buyers are chary in covering for future wants, and while the aggregate tonnage is large, it is not in proportion to the heavy inquiry. Many melters entertained the belief that a break in the market will follow the tactics of a Boston manipulator, but prices continue to soar higher while this event is awaited. We have revised our quotations and quote lake copper in carload lots 21c to 21½c, and in smaller lots at 21½c to 22c. Casting copper, 20½c to 21c, and 21c to 21½c for smaller quantities. Pig tin 38c to 40c, according to qualities. Spelter is 6¾ for carload lots, and 7½c to 8c for smaller quantities. Pig lead is 5.70 in 50-ton lots, desilverized, and 6½c to 7c for smaller quantities. Antimony is 13¼c to 15c for Hallett's, and 14c to 15c for Cookson's. Nickel is 50c to 60c, according to amount and deliveries.

There is an excellent demand for old metals and prices are higher. Approximate quotations of local dealers are as follows: Copper wire, 16c to 16.25c; copper heavy, 16c; light copper, 14.50; red brass, 14.75c; red brass borings, 12.25; tea lead, 4.75c; zinc, 5c; pewter, 23½c.

BIRMINGHAM.

Birmingham, Ala., Dec. 18.—The pig iron market in this district is still very quiet, though shipments are just as active as they can be. The furnace companies however, are confident that there will be a strong demand for all the iron that can be manufact'd during the first half of the coming year, at least. The production has slackened some in this district, the labor being unsteady as the holiday season approaches. Two Furnaces in Bessemer are out while preparations are being made to bank two or three others in other parts of the district about the last of this week. The shut down, however, is not to be of long duration. There are some furnace companies in this territory behind in the deliveries of their orders, and to catch up as much as possible every effort is being made to get quick deliveries. The railroads are doing well in the way of handling the iron, though there is a lack of sufficient locomotive power with which to care for the business.

CARNEGIE VETERANS

Enjoy Another Delightful Reunion.—Presentation of a Souvenir to the Host.

The Carnegie Veterans' Association, which is composed of Mr. Carnegie's former associates and lieutenants, and includes 47 steel men of national reputation, held its fourth annual dinner at the Carnegie residence, at Fifth avenue and Ninety-first street, New York, on the night of Dec. 15. Before the dinner Mrs. Carnegie, little Miss Carnegie, and Mr. Carnegie received the guests. After a half hour's conversation the veterans held a brief business meeting, the following officers for the ensuing year being chosen: President, Andrew Carnegie; Vice president, Charles M. Schwab; secretary and treasurer, Charles L. Taylor. A new office was created for W. B. Dickson, second vice president of the United States Steel Corporation, who read a poem and was chosen "Poet Laureate."

Dinner was served at 8 o'clock. W. E. Corey, president of the United States Steel Corporation, sat at Mr. Carnegie's left, while Charles M. Schwab occupied the chair at the host's right. Angus McPherson, the Scotch piper, who had been a feature of former dinners, did not appear. Mr. Carnegie explained: "Angus has married; has taken unto himself a Scotch lassie. Siller could not get Angus here for our reunion."

Secretary Taylor presented the president with an engraved book containing a portrait, biography and the signature of every member of the association. Mr. Carnegie said that he had believed that he possessed everything that a man might desire in this world—wealth, health, dear friends and a devoted family—but now knew that he had lacked one thing to make him perfectly happy, and that was the little volume, which was a pledge of the loyalty and esteem of his friends and business associates.

Charles M. Schwab recalled to the minds of the members many humorous incidents of the past. H. P. Bope spoke of the future, taking as his text, "What Yet Remains to be Done." W. E. Corey's remarks were repeatedly interrupted with applause. James Gayley, A. C. Dinkey, J. B. Reed, C. E. McCague and P. B. Dickson also spoke.

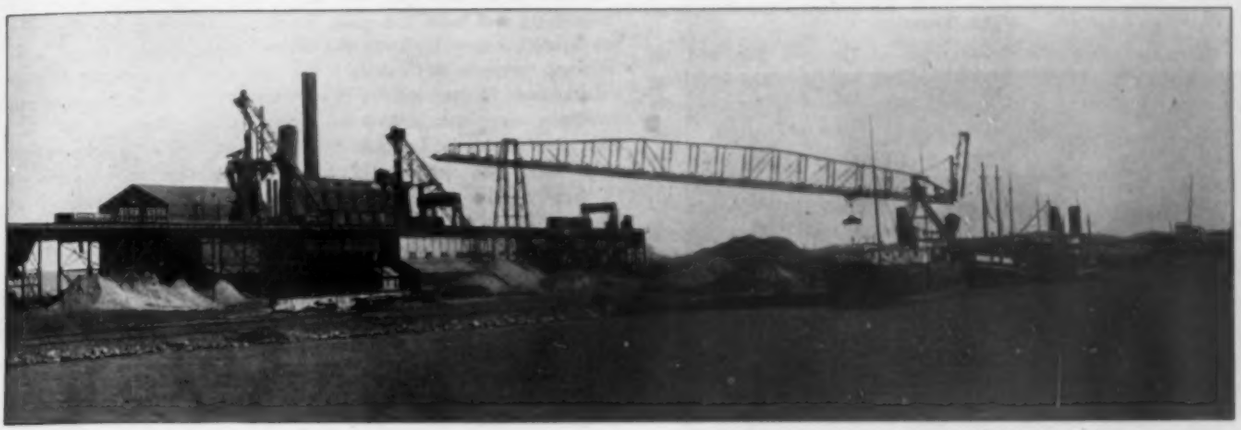
The following members were present: Charles M. Schwab, W. Ellis Corey, A. C. Dinkey, H. P. Bope, James Gayley, Thomas Morrison, W. L. Abbott, W. W. Blackburn, L. T. Brown, C. W. Baker, W. R. Balsinger, A. C. Case, J. J. Campbell, D. M. Clemson, W. B. Dickson, R. A. Franks, J. O. Hoffman, A. R. Hunt, D. G. Kerr, George Lauder, H. J. Lindsay, W. C. McCausland, C. E. McCague, John McLeod, A. Monell, G. D. Packer, A. D. Peacock, Lawrence C. Phipps, J. H. Reed, J. E. Schwab, James Scott, C. L. Taylor, H. E. Tener, E. H. Utley, G. H. Wightman, and E. F. Wood.

These sent regrets: Thomas Lynch, president of the Frick Coal Co.; John C. Fleming, J. G. Hunter, J. H. Potter, W. P. Palmer, W. H. Singer, Millard Hunsiker, P. T. Berg, E. S. Mills and John G. A. Leishman, Minister to Turkey.

The American Sheet & Tin Plate Co. has resumed operations at its mills at Elwood, Ind. Denial is made of the widespread report that the Midland Works at Muncie, Ind., have been abandoned, the statement coming from official sources that the plan is to start the plant as soon as certain changes in the annealing ovens can be completed.

The El Mamey Iron Co., Duluth, Minn., recently organized to work extensive iron deposits in the municipality of Valla de Alvarez, state of Colima, Mexico, will commence operations this month. The ore runs from 64 to 70 percent iron.

Plant of the Algoma Steel Co., Sault Ste Marie.



ORE DOCKS AND BLAST FURNACES.

The Algoma Steel Co. is a branch of the Lake Superior Corporation, which corporation controls practically all the industries at Sault Ste. Marie, Ontario. The plant was built in 1901, and commenced operation in the spring of 1902. It is thus one of the newest and most modern of all the steel plants in Canada.

The principal production of the Algoma Steel Company is steel rails. The iron from which the steel is made is smelted in two blast furnaces at the plant and then proceeds in almost a straight line through the steel works and rolling mill until it comes out a finished product at the other end.

The plant is located on the St. Mary's river a short distance above the rapids. A dock 2,250 feet long is built along the river at which the ore vessels are tied up and unloaded by means of two bridges to the piles immediately behind the dock. The Lake Superior Corporation owns a fleet of boats in which the ore is brought from the Lake Superior ranges to the plant.

The corporation also owns the Helen mine, located about one hundred and thirty miles north of Sault Ste. Marie, but the ore is not used in the plant, as it is too high in phosphorus for use in the Bessemer converter. As the company makes only Bessemer steel, it finds it necessary to obtain its ore from other sources. The ore from the Helen mine, however, is sold to other producers, in fact being practically exchanged for the Lake Superior ore.

The Ore Bridges.

The two ore bridges for unloading vessels and transferring ore to the ore pile were designed by the Wellman-Seaver-Morgan Co. Each bridge has a span of 295 feet, and a height at the inner end of 84 feet and a height at the water end of 50 feet. A cantilever arm projects over the water and is hinged at the inner end so that it may be raised out of the way or extended over the vessel as required. The motive power for operating the bucket and for moving the bridge is furnished by two 130 h. p. 500-volt motors, which are located in a house in the supporting legs at the water end. These motors are geared to counter-shafting driving three winding drums through a train of gears and clutches which are thrown in or out according to the motion desired. The capacity of the automatic bucket on the bridge is 4 tons.

Ore Pile and Storage Bins.

Three hundred and forty feet from the edge of the dock is located the storage bin system built of brick and steel, having a total height of 40 feet. The ore is actually carried in steel bins of the Berquist type, of which there are eight, with a combined capacity of 3,000 tons. The ore, as unloaded from the vessel, is either carried clear across the ore bridge to the bins, the inner end of the bridge projecting over the bins, or, if the bins are full, it is dumped on the ore pile, which may be made the full length of the dock, 2,200 feet, and 200 feet wide, and afterwards reloaded into the bins as required. Two traveling larry cars traversing the bins distribute the ore into any specified bin, thus avoiding moving the bridge. Each bin is provided with four chutes and the necessary gates for controlling the removal of the ore. These chutes are located on the side of the bin away from the water end, and deliver the ore into round buckets for the skip hoist used for charging the blast furnace. The buckets for the skip hoist are placed on flat scale

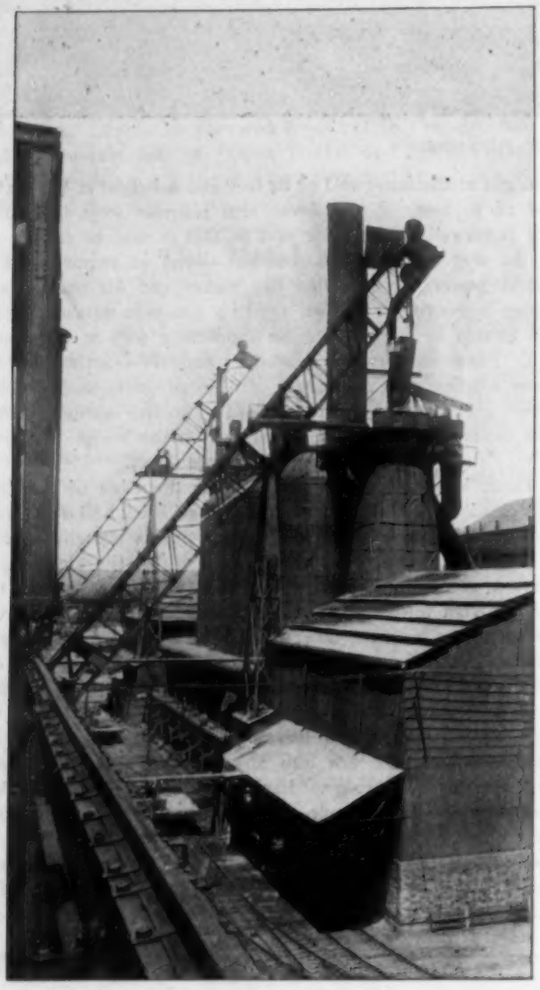
ONE OF THE ORE BRIDGES.

cars, which run on a track along the face of the bins. The cars are operated by an electric motor, the current being supplied to it by a trolley. The buckets can thus be run under any desired bin for charging.

The Trestle.

Running along the inner edge of the ore pile and on the center line of the bins is a steel trestle 1,400 feet long exclusive of the approach, and 40 feet high. This connects with the main line of the Algoma Central railway, also operated by the Lake Superior Corporation, and with the yards of the Canadian Pacific railway, so that cars of raw material may be pushed to the required position for dumping directly into the bins.

Adjacent to the ore bins there is a coke bin provided with 16 chutes through which the blast furnace hoist



THE BLAST FURNACES.

is loaded. The skip hoists to the blast furnaces are operated by 135 h. p. motors driving a four foot winding drum through double reduction gearing. The motors are controlled by means of Otis Magnet regulators which are installed in the motor houses, located at ends of the ore bins.

Blast Furnaces.

The blast furnaces are two in number, and are located in a line parallel with the dock. The dimensions of the blast furnaces are 13 feet 6 inches by 70 feet, and 15 feet 6 inches by 80 feet; both at the present are operating with coke for fuel, although one furnace was originally designed to use charcoal. The general plan contemplates the addition of two 400 ton furnaces, the trestle and bin system of which are already in place.

In the same line with the blast furnaces and between them, there are seven fire brick stoves 20 feet in diameter and 70 feet high. A steel stack 150 feet high at the rear of the stoves removes the waste gases after their passage through the stoves. The furnaces are provided with adequate dust catchers from which the dust is dropped direct into standard steel hopper cars.

Beside each furnace and with its axis in the same straight line joining the furnaces, are two cast houses of steel and corrugated iron structure into which the iron may be run and made into pigs if necessary, or, into 20-ton ladles, mounted on standard gauge railway trucks, which convey it to the steel plant mixer or to the pig casting machine.

The Blowing Engines.

The air blast for the blast furnaces is supplied by four blowing engines located in an engine house parallel with the blast furnaces. The house is of steel construction covered with corrugated iron, the engines being arranged along its center line. The engines are of the steeple Corliss type, and were built by the Mesta Machine Co. The steam cylinders are 44 inches by 60 inches, and the air cylinders are 72 inches by 60 inches. The engines run at about forty revolutions per minute, and are capable of blowing thirty pounds pressure. Each engine has a fly wheel 24 feet in diameter. One engine is provided with a gear wheel on its main shaft, enabling it to drive two 225 kilowatt electric generators, which are used to supply current to the entire plant in case of emergency. The generators may also be run as motors, if desired, making this unit a very interesting machine. The generator switches may be opened and the machine run simply as a steam driven blowing engine, exactly as the other three engines in the building; or the steam may be shut off and the generators used as motors, thus making the machine a motor driven blowing engine. The air cylinders may be put out of service and the machine becomes a steam driven electric generating unit, or with the air cylinders and the generator both connected it operates as a combination electric generating unit and blowing machine. As a matter of fact it has been used in all four capacities.

Steam is furnished for operating the blowing engines by a battery of twelve Cahall vertical water-tube boilers, each of 250 h. p. The boilers are arranged in batteries of two, three, three and four respectively.

The boiler house is built of steel and is erected in a line with the engine house and about fifty feet distant. Each boiler is provided with a 36 inch stack 40 feet high.

Pig Casting Machine.

The iron is delivered from the blast furnaces into the 20-ton ladles, as heretofore noted, and is carried by them to a steel and corrugated iron building shaped roughly like an H, and about 800 feet distant from the blowing engine house. In this building there is installed a three strand Heyl & Patterson casting machine. Each leg of the H contains a railroad track, the casting machine being in the cross piece. At the delivery end the buckets run up an incline which elevates them above the level of a gondola car, placed on the railroad track, and the molds in turning over a head wheel throw the hardened pigs into the car for delivery to the steel mill.

The machine is fed directly from the 20-ton ladles brought over from the blast furnaces. The ladles are picked up by a 40-ton traveling crane, fitted with an auxiliary hoist. The ladles are then carried over the receiving end of the pig machine, and are tipped by appropriate mechanism. The pig machine is driven by a 30 h. p.

220-volt motor, located in a house near the delivery end of the machine.

The molds are returned under the frame of the machine and when about twenty feet from the receiving end are dried and smoked by passing over coal fires located in portable furnaces about six feet square. These furnaces are mounted on wheels and are run underneath the machine. They can be withdrawn into a pit along side of the machine for cleaning or repairing. The steam from the machine and the gases from the furnaces are removed by means of two hoods and four stacks placed over the furnace.

Steel Mill.

The steel, rail, and finishing mills are installed in a series of buildings adjoining each other and extending practically in a straight line. For the most part the buildings are constructed of red sandstone with steel and corrugated iron roofs. At the extreme end, however, there is a new building constructed of steel and corrugated iron in which is installed a 150-ton mixer for handling molten iron direct from the blast furnaces. This mixer was constructed by the Variety Iron Works, and is served by a 40-ton electric traveling crane built by the Whiting Foundry & Equipment Co., for lifting the ladles which are brought from the blast furnaces on a standard

THE BESSEMER CONVERTERS.

gauge railroad track running into the building along side the mixer.

Adjacent to the mixer building is a cupola building containing cupolas used for melting the pig iron for the converters, and also furnishing spiegeleisen for the same. The cupolas for melting the iron are 8 feet in diameter and have a capacity of about 25 tons per hour. The three spiegel cupolas are each 5 feet 6 inches in diameter. The iron cupolas are located in a line on one side of the building and each pour into a trough which leads down into the floor below on which is located the iron ladle car, which serves the converters. The iron can also be run from the cupolas into a 20-ton receiving ladle and delivered into the mixer. The spiegeleisen cupolas are grouped in a triangle, their spouts leading down through the floor and command the spiegel ladle car.

A pair of Otis electric elevators serve to convey the charges of coke and iron to the charging floor of the cupola house.

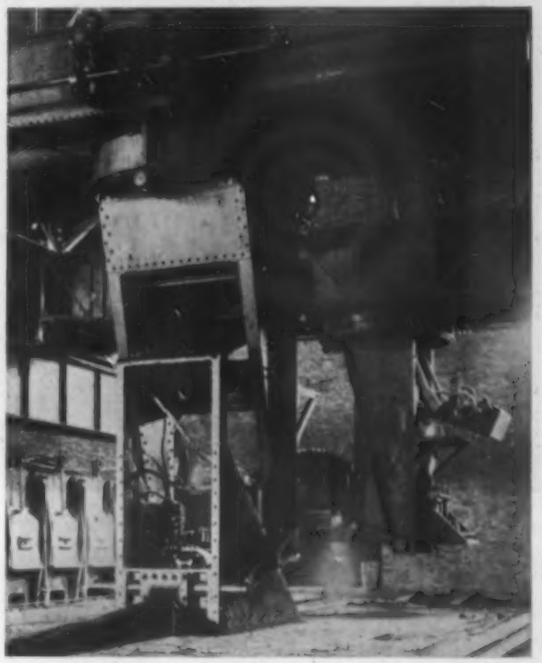
The floor below the cupolas contains narrow gauge tracks on which the ladles are run to the converters. The ladles are mounted on trucks which are drawn by electric locomotives to the converters. While being filled from either the mixer or the cupolas the trucks stand on a scale platform which weighs the iron as it is poured to them.

The Bessemer converters are two in number, each of 4 tons capacity, and are mounted on a platform which is on a level with the lower floor of the cupola house. The blast is furnished at a pressure of about 18 pounds, by two blowing engines located in a separate building. The converters pour into a ladle mounted on a hydraulic jib crane which swings over the ingot molds which stand on cars. The ingot molds after being filled are pushed farther along the mill by a narrow gauge locomotive to the elec-

INGOT EXTRACTOR.

tric stripper. As soon as stripped the ingots are placed in two four-hole gas fired soaking pits located in the same building with the Bessemer converters, and some 50 feet distant. Each hole in the soaking pit has a capacity of four ingots.

In the same building with the converters and soaking pits is the 32″ Blooming Mill. The ingots are withdrawn



REVOLVING SLAB CHARGERS.

from the soaking pits by means of an automatic E. O. T. crane and delivered directly to the table of the blooming mill, the rolls of which are driven by a pair of reversing Southwark engines 28 by 48 inches. The tables are operated by electric motors and the operator is located in a pulpit above the rolls and controls the engine, the table, and the manipulation of the ingot.

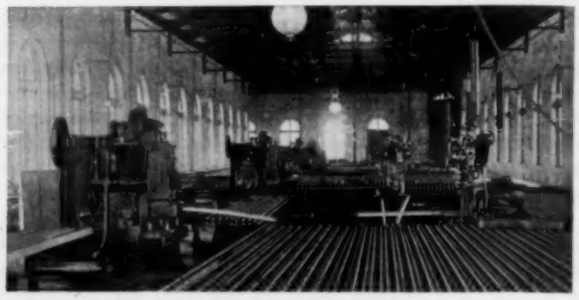
The ingots are bloomed to 8 inches by 8 inches and are then carried along the table to a powerful steam shear,

and cut into blooms the proper length for rolling two rails.

The crop ends drop into an inclined flight conveyer with a metal bottom which elevates them into narrow gauge cars, which cars convey them to the stock pile, and from which they are afterwards charged to the cupolas. The blooms are delivered from the table of the press onto a stationary table from which they are pushed by a hydraulic pusher onto cars operated by electric motors. Each car has a capacity of four blooms and carries the blooms to the reheating furnaces where they are brought up to the proper temperature for rolling into rails.

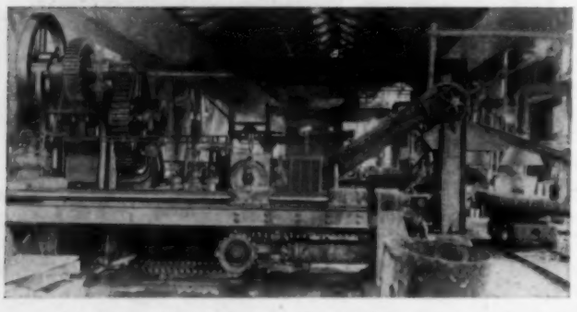
Reheating Furnaces.

The reheating furnaces are located in a building at right angles and adjoining the end of the blooming mill.



RAIL MILL, SHEAR AND DRILLING DEPARTMENT.

RAIL MILL SHOWING TRAVELING MILL TABLES.



RAIL SHEAR AND STUB CONVEYOR.

It contains three horizontal furnaces of the regenerative type. The reheating furnaces are operated by producer gas supplied from the gas producers already mentioned.

The building is spanned by two bloom charging cranes supplied by the Wellman-Seaver-Morgan Co. These cranes deliver the bloom from the car to the furnace, and when heated draw it from the furnace and deposit it on the table of the rail mill which extends to the furnace building.

Rail Mill.

This building is parallel to the steel mill and joins the building containing the heating furnaces. It contains two sets of roughing rolls and one set of finishing rolls. These rolls are all three-high and are coupled together and driven by a simple condensing Porter-Allen 40 x 48 engine. The piece receives four passes in the first set of rolls and four in the second set and three in the finishing set.

The train is served on the front side by two electrically operated traveling tables equipped with tilting motors

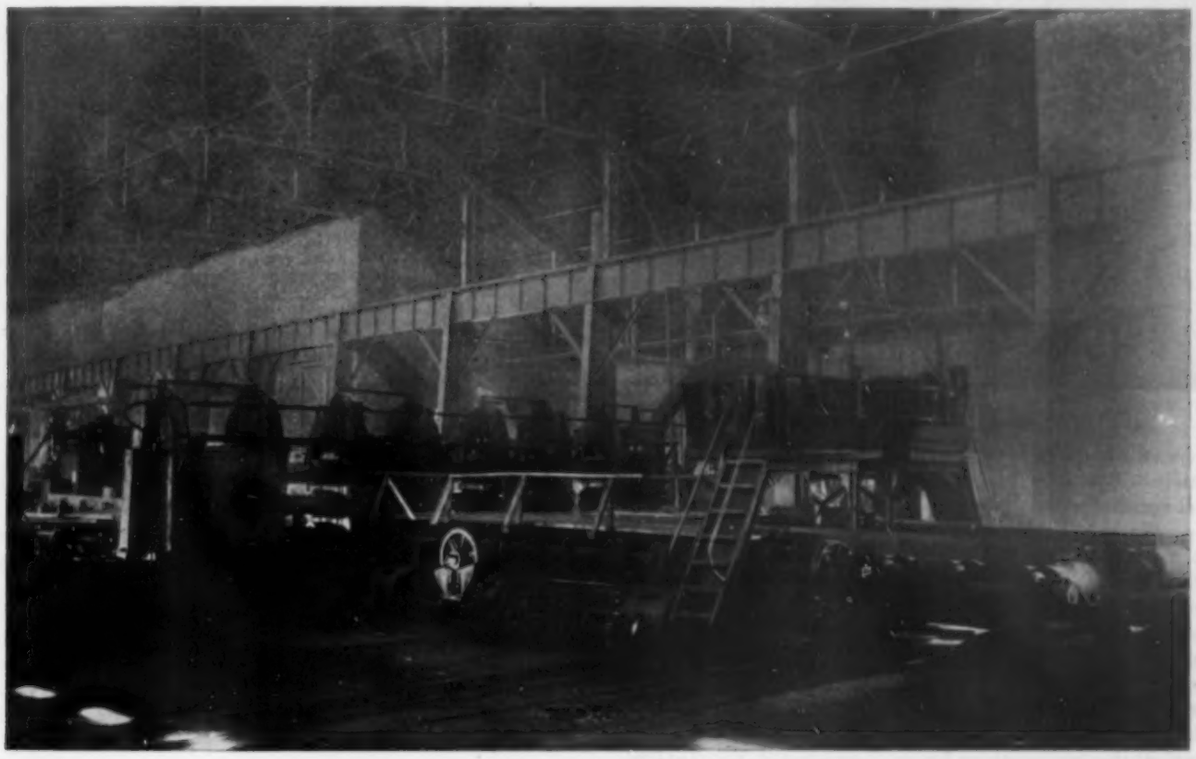
and on the back side by three stationary tilting tables designed and furnished by the Wellman-Seaver-Morgan Co.

After passing through the finishing rolls the rail is conveyed about 75 feet and is sawed to the proper length by means of two hot saws which are belt driven from 75 horsepower motors. After being sawed the rails are stamped, cambered, and then run onto the hot beds.

The hot beds, of which there are two, each 140 feet long, are located in a stone building immediately adjoining and at right angles with the rail mill.

Finishing Mill.

The finishing mill adjoins the hot beds and is parallel to the rail mill. Along one side of the building is a roller table for conveying the rails to any desired set of straightening and drilling machines. The rails are delivered onto skids alongside the machine and the burrs left by the hot saws are chipped from them by a man at each end of the rail. After being chipped they are straightened in the presses and then passed on to the drilling machines.



RAIL MILL SHOWING SUBSTANTIAL STRUCTURAL WORK.

There are four straightening presses and eight drill presses, each one independently motor driven.

After being drilled the rails are loaded directly on cars for shipment. A track of the Algoma Central runs into the building on one side and is located at a lower level than the skids, thus enabling the rails to be dropped on the car with a minimum of labor.

The Power Plant.

The power plant for the steel mill is located in a building about 75 feet to the west of the steel mill and parallel to it. In this building are located the boilers which furnish steam to the engines in the steel mill; the gas producer which furnishes gas for the soaking pits and reheating furnaces; the blowing engines for the converters; the blowers for the cupolas and the pumps for furnishing water to the boilers and for operating the hydraulic machinery around the plant.

The boilers are arranged in two batteries each containing eight Stirling boilers of 250 horsepower each. The two batteries of boilers are separated by a room containing the gas producers. The boilers are hand fired, coal being dumped on the floor by means of a belt conveyor which discharges into spouts leading to the floor in front of each boiler. The conveyor receives coal outside the building and elevates it, carrying it over the top of the boilers, delivering it to any boiler or to the gas producers as desired.

The gas producers are three in number and are of the Frazer-Talbot Mechanical type.

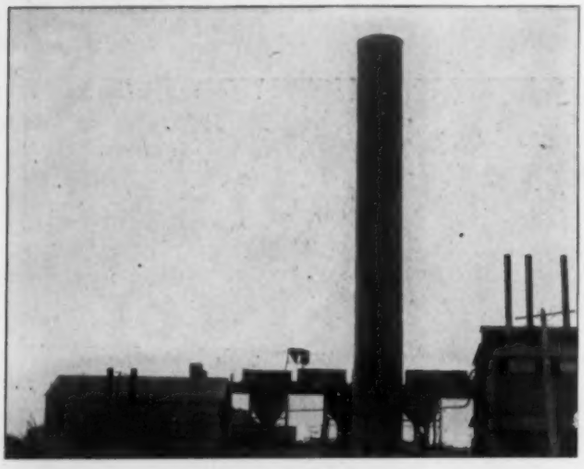
Adjoining the second battery of boilers on the south is the engine room. This room contains two blowing engines for furnishing the blast to the converters. These engines were built by the E. P. Allis Co., and the Southwark Foundry & Machine Co. of Philadelphia, respectively.

The blowing engines are both of the steeple type, simple engines. The steam cylinder of the Allis engine is 40 by 48 inches, and the air cylinder is 54 by 48 inches. The air cylinder of the Southwark engine is the same size, the steam cylinder, however, being 42 by 48 inches. Blast is furnished to the cupolas by two size 7 Root blowers driven by steam engines, and one size 4 Root blower driven by an electric motor. These are located in one corner of the engine room, the opposite corner being occupied by two Wilson-Snyder pumps and a hydraulic accumulator, which furnishes power for the hydraulic cranes and other hydraulic apparatus in the steel mill. In addition to this machinery there is installed in the engine room a battery of four duplex steam pumps used for feeding the boilers, and a Cochrane feed water heater of sufficient capacity to take care of all the feed water for the boilers.

In addition to this pumping machinery there is an additional set of pumps which is installed in a pump house near the blast furnaces. This pump house contains three Wilson-Snyder duplex, compound inside packing pumps

with steam cylinders 16 and 30 by 30 inches, and water cylinders 21 by 30 inches. These pumps supply water for general use throughout the plant, and also for domestic use in the workmen's houses which the company has built near by. In addition to these pumps there is installed in the pump house a Worthington jet condenser with a Worthington duplex air pump which takes care of all three pumps. The pumps deliver to a stand pipe directly in the rear of the pump house. The system was designed for an ultimate capacity of 30 million gallons in twenty-four hours. At present the capacity is 15 million gallons.

All the buildings about the plant are of the most substantial construction. The red sand stone, which has been used in the original buildings, presents an imposing appearance quite unusual in a steel mill. The plant is well designed for its work, the operation proceeding in a practically straight line, and with a minimum amount of handling. With the

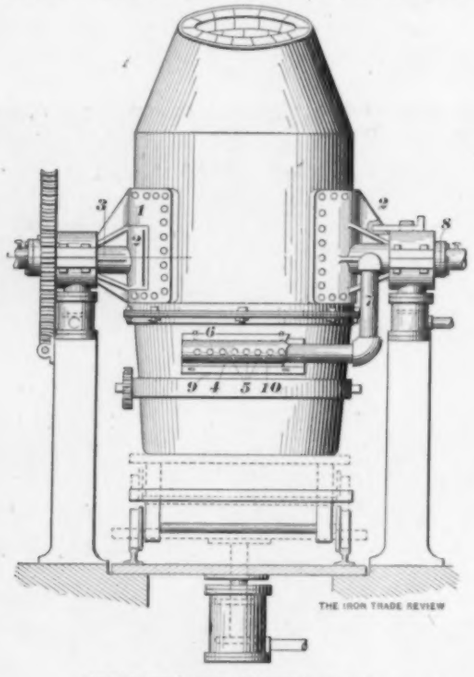


PUMP HOUSE AND STAND PIPE.

amount of railroad building contemplated in Canada the mill will doubtless be kept very busy for a long time, and will become one of the foremost industries in Canada.

APPARATUS FOR MAKING STEEL.

Edwin C. Wills has patented an invention for the use in the manufacture of steel, which relates particularly to the construction of the converter and the means for operating its several parts, and for admitting air in the use of the apparatus. The inventor provides a converter having an upper or dome section and a lower or ladle section and means for connecting the dome section with the ladle section, the two sections being conveniently disconnected when desired. The dome section is supported on trunnions, so that it can be readily turned to or beyond the horizontal position or to any position between the same and the upright position, and twyers being provided on the dome section and the ladle section, so that air may be introduced to either the ladle or dome section, or both, as desired. The converter may be tilted to discharge the metal from the nose of the dome section or the ladle section may be detached from the dome section and moved to any desired point and the metal discharged directly from the ladle. The dome section has a twyer 1 at one side which has a wind box 2, to which air is discharged through the hollow trunnion 3. It is provided with numerous twyer openings, discharging to the interior of the dome section. By this construction it will be noticed that air may be supplied to the dome whenever desired. The ladle section is provided with a twyer 4 near its upper end, and has a wind box provided with twyer openings 5. The wind box is adapted for connection with the coupling head 6, which is secured to the pipe connection 7, leading to the hollow trunnion 8, through which air is supplied to the twyer of the ladle section. As shown, the wind box is open at its outer end, and is provided at this end with an upturned flange 9 at its upper edge. The coupling plate 10 is adapted to close the outer end of the wind box, arranged at its outer edge and to fit in the hooked flange at the base of the wind box, and provided at its upper edge with an inwardly projecting wing overlapping the upwardly projecting flange of the wind box. It is held in place by means of keys by which the coupling head may be secured to the wind box when the parts are applied. The pipe connection 7 is secured at one end in connection with the hollow trunnions 8 preferably by threading it therein. Its other end is connected with one end of the coupling head 10 preferably also by threading it so that when the parts are applied and it is desired to disconnect the coupling plate from the wind



APPARATUS FOR MAKING STEEL.

box it is only necessary to raise the coupling head out of engagement with the wind box by swinging the pipe connection on its joint, and when the parts have been disconnected the coupling head may be permitted to swing down, the pipe connection turning at the joint next the trunnions.

GUN FACTORY NEEDS EXTENSIONS.

(Special Correspondence.)

WASHINGTON, D. C., Dec. 19.— The forthcoming report of the Chief of the Bureau of Ordnance, navy department, will recommend that Congress at once vote the necessary amount for installing new and improved machinery in the existing shops of the Naval Gun Factory and for the erection and equipment of a new brass, iron and steel foundry and foundry-yard building. For these purposes, it is estimated, $571,245 will be required. The gun factory, through failure of Congress at its last session to make appropriations for much needed extensions, has been working three eight hour shifts in an attempt to turn out equipment fast enough to supply the new warships as they were completed. As a result the factory's machinery is badly worn. Estimates are presented for increasing the plant so as to equal the demands upon it and cut off the letting out of part of its work to private concerns. This will require $3,300,580, and the bureau does not expect to secure it at the present session.

TARIFF INCREASES

BY CANADIAN PARLIAMENT REGARDED AS IMPROBABLE.

Protection Has Apparently Reached Its Limit.—Various Views on Conditions and Prospects of the Iron and Steel Business.

(Special Correspondence.)

TORONTO, CAN., Dec. 19.—The movement in favor of a considerable increase in the Canadian tariff on imports is naturally watched with a good deal of interest by American manufacturers who find an increasing market for their product on this side of the line. It is not regarded as at all probable, however, that any action will be taken in this matter at the approaching session of 1907. There is also no reason to suppose, from present appearances, that the revised tariff will comprise any general or substantial increase for protective purposes.

So far as the proceedings before the Tariff Commission have gone, the advocates of high protection have presented a decidedly weak case. A feature of which their opponents have not been slow to take advantage is the contradictory nature of their arguments and appeals. In nearly every instance the requests for increased protection for the manufacture of finished products were accompanied with demands for the reduction or abrogation of duties on articles in the first stage of manufacture which furnish their raw material. This was especially noticeable in connection with the metal trades. The want of harmony and mutual understanding among the different branches, each claiming everything for itself, instead of uniting in a well-considered plan in which the interests of all would have been regarded, is quite sufficient to prevent the success of any movement for a general increase of duties.

Another noteworthy feature of the hearing was the strong opposition to any tariff increase shown by the farmers, who, as a class, are decidedly adverse to the proposals of the manufacturers. In previous agitations the case has gone against them by default. They then took no concerted action for the presentation of their views. All this has now changed. Deputation after deputation from the rural districts has been heard in opposition to any further increase in the tariff. The feeling among the farmers of Ontario is not universal, as in many localities the proximity of industrial centers affords an advantageous home market, and those who suppose that these industries are seriously threatened owing to the absence of a high tariff are naturally protectionists. But the case is very different in the West, the rapid settlement of which, with a corresponding increase in representation at Ottawa, renders it a factor of growing consequence in politics.

The absence of any benefit to the farming community from a local industrial home market, except to a very limited extent in Winnipeg and possibly a few other places in Manitoba ranges the settlers solidly in favor of free trade. Protectionists on the prairies are scarce as hens' teeth. Any move in the direction of increased protection would be strongly resented everywhere between Winnipeg and the Rockies.

The strength of this feeling was strikingly manifested in the election of 1900, which in eastern Canada was fought by the conservatives partly on the tariff issue. This was so unpopular in the west that Hugh John McDonald, (son of Sir John McDonald, the father of Canadian protectionism), who led the campaign in Manitoba, astounded his colleagues by repudiating their policy and declaring for free trade in agricultural implements and a low tariff. The increased importance of the western vote, which owing to the obvious interests of that section, is practically a free trade vote, renders high protection, or even a very considerable increase in present duties a much more remote contingency than it appeared a few years ago, especially when it is borne in mind that Sir Wilfrid's government has the almost undivided support of the delegations representing the new provinces. Ontario, on the contrary, where the demand for protection is strongest, sends a hostile majority to Ottawa. It is hardly conceivable that any leader of ordinary political sagacity would alienate such a large and influential body of supporters as the government possesses in the western settlers, on the doubtful chance of winning a few eastern constituencies.

The growing feeling on the part of the general public against trusts and combines presents another stumbling-block in the path of the high-tariff advocates. Recent developments in Toronto and elsewhere have greatly stimulated this sentiment, and it is being extensively used as argument against any further tariff concessions to manufacturers. Without entering into the question as to whether a high tariff operates in favor of trusts or not, the effect of late disclosures upon public opinion must undoubtedly be reckoned among the influences which will strengthen the hands of the party in power in refusing further advances, and possibly in reducing some of the present duties.

All these considerations point to the conclusion that protection in Canada has reached its limit, and that any change in the near future tending to reduce the volume of importations—except in perhaps special and isolated cases—is highly improbable.

Conditions and Prospects.

In response to inquries from *The Iron Trade Review* concerning present conditions and the prospects of the iron and steel business in Canada, a number of interesting letters have been received.

The Iron Trade Review's regular correspondent in Toronto writes:

"In estimating the future possibilities of the Canadian iron and steel industry, there is one very obvious consideration which should not be overlooked. The great opportunities now presented by the Canadian market are not caused by a steady growth of the normal demand, but are the result of a sudden and rapid expansion, mainly due to the construction and equipment of railroads on a wholly unprecedented scale. This is essentially a largely transitory and spasmodic demand. The era of railroad building at the rate now prevailing can last at most for only a few years. When the lines now under contract are completed and equipped, the demand will shrink to normal requirements, increasing, of course, from year to year with the settlement and natural development of the country, but much below the present rate of consumption. Another element of uncertainty is the fact that so far as the general progress and prosperity of the Canadian West is concerned, everything is staked upon the wheat harvest. Good crops have been the rule for some years, but this can hardly be expected to last forever, and with a single bad harvest would come a check to immigration, a shrinkage in speculative land values and a general trade depression. While there is room for the growth of the iron and steel manufacture in Canada, it would be a mistake to accept present exceptionally favorable conditions as the measure of the permanent demand of the market."

An Optimistic View.

The London Rolling Mill Co., London, Canada, which manufactures merchant bar iron and steel, writes:

"We have been established in this city for a little over three years and during that time have not lost a single day, owing to lack of business, nor have we lost a single

dollar in bad debts. Our capacity is about sixty tons daily, running double turn. Our product has been going chiefly into the hands of hardware merchants and wagon and implement manufacturers, but lately we have taken up considerable railroad business and at the present time have more orders on our books than ever before in our existence and at a better average price, in fact our product is practically sold for four or five months to come. We consider the outlook for the future most encouraging; the material required for the many miles of railway under construction and planned to be constructed, together with the iron and steel required for the building of the immense amount of rolling stock needed for its equipment, will in our opinion tax the iron mills of Canada to their utmost for years to come. Added to this the population is rapidly increasing, especially in the west, and this in itself gives an assurance of healthy development of the business. Our chief concern for the future is to provide ways and means to take care of the trade, which we are confident will be offered."

Much Depends on the Tariff.

The Hamilton Steel & Iron Co., Hamilton, Canada, gives it views as follows:

"First. The past experience of the iron and steel trade in Canada has not been very satisfactory, owing to the limited market, unstable condition of the tariff and to the fact that Canada has for years been a convenient dumping ground for both English and American makers.

"Second. The present condition of business is better than it was before the penalty for dumping was enacted by the government, but there is not yet sufficient business to keep all the Canadian mills fully occupied and the result is that with the home consumption the price of bar iron is lower today than it is in Chicago (for instance). The competition for steel business is also very keen.

"Third. As to future prospects; they will depend very largely upon the action that the government takes with regard to the tariff at the next meeting of Parliament. If a fair and reasonable duty is imposed upon imports we think with the large immigration that may reasonably be expected into our North West, and the railway construction contemplated, the demand for iron and steel products ought to be large enough to keep the existing mills fairly busy during the next two or three years."

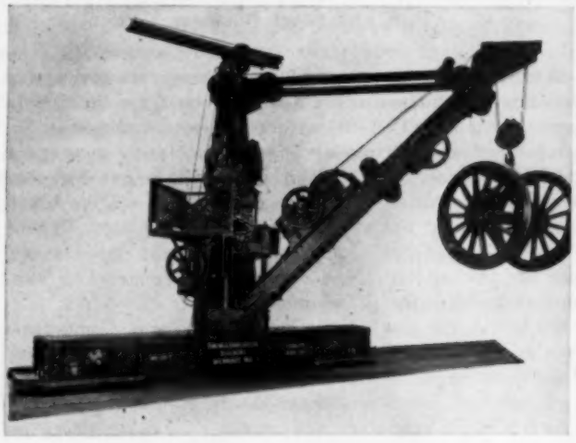
A NEW SEVEN-TON WALKING JIB CRANE.

A walking jib crane recently erected by Pawling & Harnischfeger, Milwaukee, Wis., for the Chicago & Northwestern Railway Company for use in its locomotive repair shop at the West Chicago Works was specially designed to conform to requirements for operating in places that presented peculiar difficulties in handling otherwise.

The truck girder, or housing, contains and supports by removable bearings the two main truck wheels, which are the drivers of the crane traveling motion. To the side of the girder are fastened the propelling motor, shafting and gearing, directly connected to the two driving trucks. The column socket is also contained in and is part of the girder. Fastened to this socket is the main slewing gear.

The center post is machined from a solid steel forging, about the bottom of which is the heavy cast iron roller frame supporting the channel frame and main boom. This roller frame also carries the slewing pinion shaft and two thrust rollers. To the upper end of the center post is fastened the pintle, with steel idler wheels, between which the guiding rail is placed. On the center post and immediately below the pintle is the steel cross head, with plate hangers for fastening the upper ends of the channel frame, and that also receives the shafts, sheaves and equalizer yoke of the boom adjusting mechanism. The weight of all the revolving parts and load is suspended from the cross head.

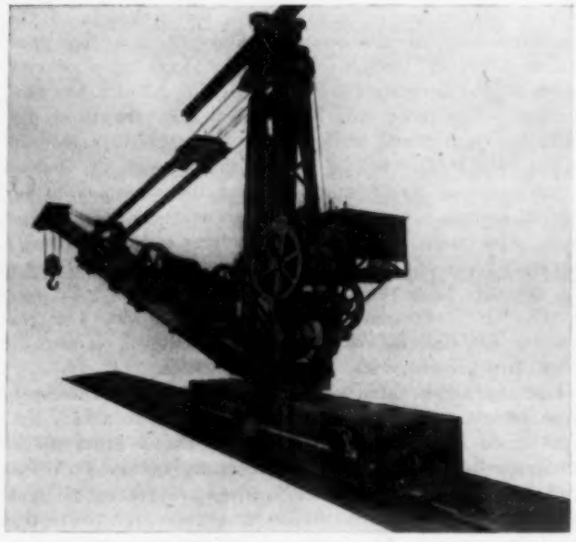
The distinguishing features of this design are the adjustment of the main boom for different heights and the auxiliary or extension boom. The latter can be extended for a hook radius of 23 feet by a screw arrangement, worked by hand power through the pendent chain and



VIEW OF CRANE (OPERATING SIDE.)

handled from the floor. All the other movements are by electric power, each having an individual motor. Attached to the side of the channel frame is the operator's cage, which swings with the crane and is sufficiently elevated so that the operator can always see the hook or load and observe any obstructions that would be in the way of the swinging boom.

The mechanism throughout is provided with spur gearing except the traveling motion. Safety devices to avoid breakage due to carelessness of the operator are provided



VIEW OF CRANE (REVERSE SIDE.)

where needed. Electric current is supplied to the crane from collectors fastened to the top pintle and in contact with main line wires. To the center post are fastened the collector rings for the main lines to the switchboard in the operator's cage and for the distributing lines to the travel motor.

The crane has a capacity of 7 tons at 16 feet radius of boom and about 20 feet lift. The approximate weight of the machine is 41,000 pounds.

VERTICAL BLOWING ENGINE

WITH LONG CROSS-HEAD AND HIGH PRESSURE STEAM CYLINDER.

One of the recent and noteworthy pieces of installation work is that of the 18 vertical blowing engines for the Tennessee Coal, Iron & Railroad Co., of Birmingham, Ala. These engines, designed and built by the Mesta Machine Co., of Pittsburg, are of the long cross-head type especially adapted for the medium sized furnaces so widely used in the south. While the design is such as to give the engine a handsome and well balanced appearance, the economy guarantee is the special and emphasized feature. Twelve of the eighteen engines are provided with high pressure steam cylinders while the remaining six have low pressure cylinders. The general design and construction of both are similar, with the exception of the dimensions of the base, which in the case of the low pressure steam cylinder engine is somewhat wider to allow for the increased cylinder diameter. The high pressure cylinder engines, of which this article more especially treats, (Fig. 1) are of modern construction throughout, and entirely self contained. With a steam pressure of 150 lb. per square inch, the engine is designed to blow air up to 30 lb., running at a speed of 50 revolutions per minute. The steam and air cylinders are arranged in vertical tandem, the former 44 in. in diameter, with a 60 in. stroke, being mounted on a plate directly above the shaft, while the air cylinder, 84 in. in diameter, by 60 in. stroke, is supported above the steam cylinder, on frames or housings placed on either side of the steam cylinder and rigidly bolted to the bed plate. A complete cross-section is shown in Fig. 2.

In addition to forming the supporting medium to the air cylinder, the upper part of these frames carries the cross-head guides. A long cross-head to which are connected the air and steam cylinder piston rods, travels between the steam and air cylinders extending through the side frames and carries at its outer extremity, on suitable journals, the upper ends of the two connecting rods. On either side of the engine, and mounted on the ends of the shafts are placed two balanced fly wheels 20 ft. in diameter and weighing 25 tons each. The hubs of the wheels serve also as cranks and carry the crank pins and lower ends of the connecting rods. The shaft, 20 inches in diameter between journals is supported in bearings 18 inches in diameter by 24 inches long, which are formed in the rectangular box shaped, strongly ribbed bed plate with semicircular bottom shells and top caps. The arrangement of the journals is such that they may be removed when relieved of the shaft, fly-wheel, etc.

The frames or housings are flat ribbed castings divided into two upper and two lower housings, the upper housing supporting the air cylinder and forming the cross-head guide. To restore the cross sectional area, removed in allowing for the cross-head openings additional ribs reinforce the housing.

The cross-head is a steel casting of proper form to resist the strain encountered under all conditions of load. To this the piston rods of the air and steam cylinders are connected by a pin passing through a sleeve, to which the piston rods are keyed. This arrangement provides the requisite strength and the flexibility necessary to prevent the breaking of piston or connecting rods, should the latter be improperly adjusted.

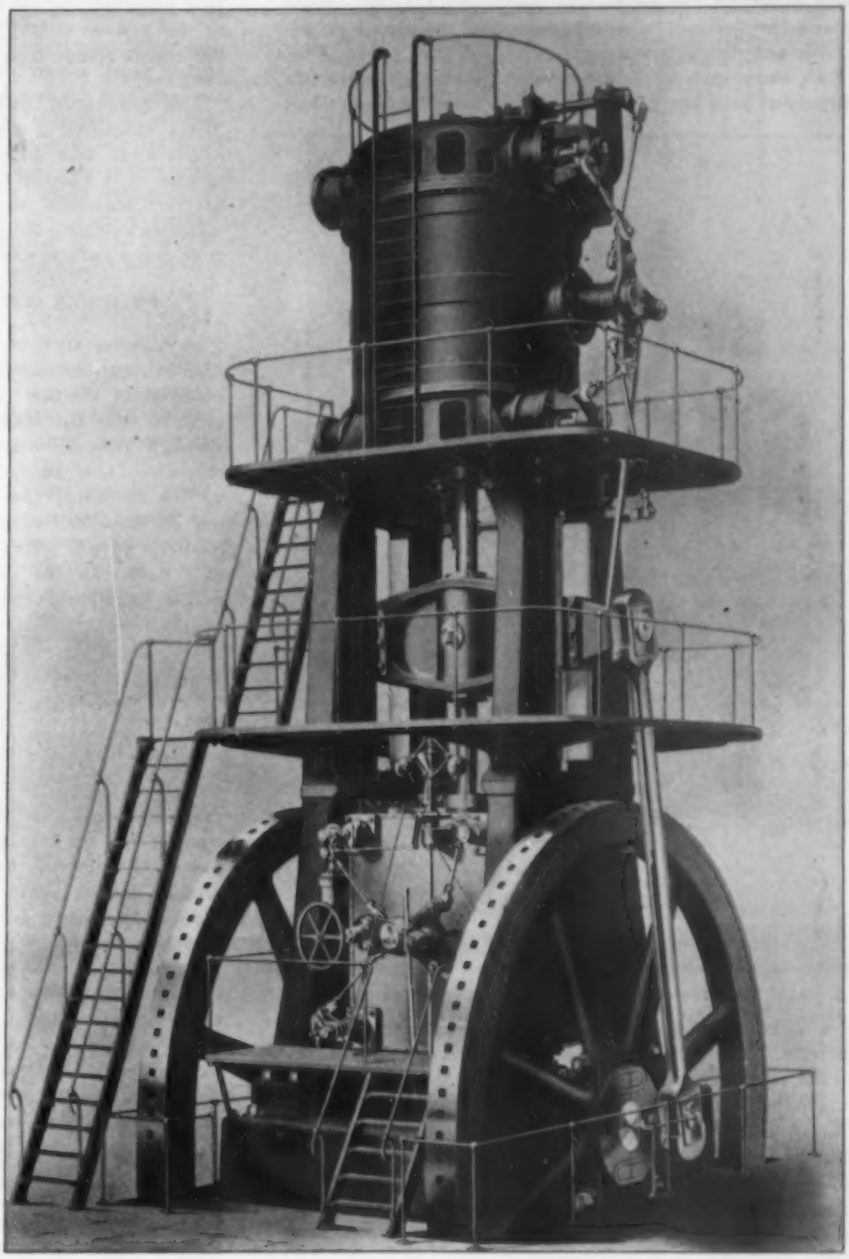


FIG. 1.—VERTICAL BLOWING ENGINE.

The air cylinder has top and bottom heads which contain inlet and discharge valves. The inlet valves are of Corliss

type, and positively opened and closed by suitable mechanism. The discharge valves, while they are positively closed, open automatically when the pressure in the cylinder equals that in the discharge pipe. The whole arrangement is substantially constructed and practically noiseless.

The steam cylinder walls are made of ample thickness to withstand a continuous working pressure of 150 pounds per square inch, after reboring one-half inch larger than the original diameter. The cylinder is equipped with Corliss valve gear having reliable and practically noiseless vacuum pots, and all parts possess ample bearing surface, as well as being adjustable for wear. The valves are a single casting and can be removed without dismantling the gear; an admirable and desirable feature.

Both steam and air cylinder valve gears, each adjustable independently of the other, are driven from the main shaft

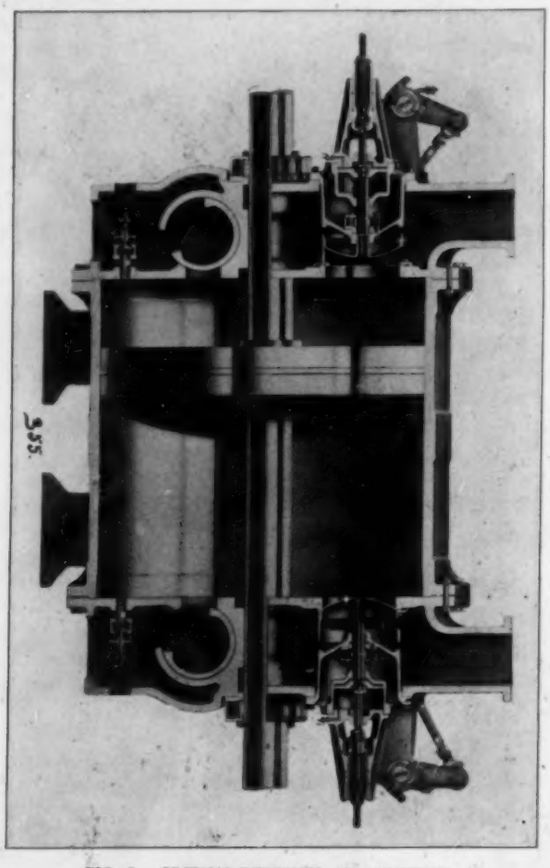


FIG. 2.—SECTION THROUGH AIR CYLINDER.

by a suitable arrangement of mitre gears having machine cut teeth. The gear on the main shaft is split so that it can be readily removed. The whole arrangement permits the greatest refinement of adjustment.

Speed regulation is accomplished within the narrowest limits compatible with stable regulation by means of a fly ball governor. In addition there is a variable speed device operated by a hand wheel. In case the regulator driving mechanism is deranged the engine is automatically stopped.

The pistons are fitted on the steel rods with a taper, secured by nuts, and are deep in proportion to the cylinder diameters, thereby presenting a large wearing surface. The packing is a single cast iron ring in three parts, with brass keepers, and can be removed or renewed without removing the pistons from the cylinders.

The connecting rods of steel are forged in one piece with solid ends; adjustment being obtained by means of broad wedges and locking bolts. The crank-pin journals are faced with babbitt, while the cross head pin journals are bronze. Open-hearth forged steel of the highest grade is used in the shaft.

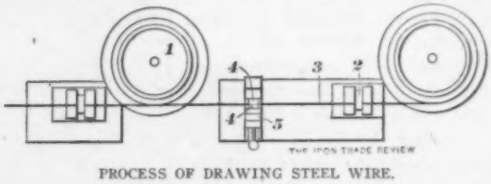
Sight feed lubrication is provided for the steam cylinders, and a multiple feed oil pump for the air cylinder. Lubrication of all other parts is accomplished by glass bodied graduating oilers or grease cups.

All parts of the engine are rendered accessible to the operator by means of iron stairways and rail gallery. The engine in its entirety is built up of sound material, free of objectional blemishes and of such kind and quality as the long experience of the builders has shown to be best adapted to the various parts. With a total weight of 356,000 lb. the engine stands high in the field of work for which it is designed.

This installation of blowing engines is only a part of the Mesta equipment at the Ensley, Ala., rail mills of the Tennessee Coal, Iron & Railroad Co., the remainder consisting in part of a 1,000 horsepower Corliss engine of the high pressure horizontal and low pressure vertical cylinder type weighing complete 800,000 pounds and replacing a 52 by 72 Allis engine which was found to be too light for the service.

PROCESS OF DRAWING STEEL WIRE.

In drawing steel wire through metallic dies it is necessary in order to prevent the material of the wire and the material of the die from coming together in close contact, to coat the wire with a substance which will pass through the die with the wire. This coating prevents the wire from amalgamating with the die or "stopping up" in the die. The material commonly used for coating all sizes below the largest is a bronze composed of copper and tin, which is plated upon the wire in a suitable bath. In the continuous process the wire is propelled by a series of drums rotating at successively in-



PROCESS OF DRAWING STEEL WIRE.

creasing peripheral speeds to correspond to the elongation of the wire in the successive dies, the wire being passed through the first die, wrapped one or more turns around the succeeding traction-drum, passed through the second die, wrapped one or more turns around the section-drum, etc. It is necessary that these drums shall revolve at a greater peripheral speed than the speed of the wire in contact therewith, so as to allow of variation in the elongation of the wire, due to the variation in the size of the eye of the die, such variation being caused either by the wear of the die or because of its being of improper size when made. The excess speed of the drum sometimes causes the coating of the wire to be removed in a narrow strip throughout its entire length for each traction-drum around which the wire is wrapped. When several traction-drums have removed these narrow strips a considerable part of the coating of the wire is gone, and the steel of the wire coming in contact with the die causes an adhesion or stopping up of the wire in the die. The above difficulties, it is claimed, are overcome by the invention of J. A. Horton, which is carried out by renewing the coating of the wire with a soft material of a similar nature, such as the copper-and-tin alloy or bronze above mentioned.

Between the drums 1 and the die 2 the wire 3 is embraced by a pair of blocks 4, held in a vise 5, and composed of the same or similar material to the coating of

A NEW TOGGLE DRAWING PRESS.

The illustration herewith shows a new toggle drawing press, now built by the Toledo Machine & Tool Co., and known as its No. 167.

Figures 1 and 2 show link, bell crank, and yoke movement combined operated directly from the crank shaft. With this movement the required power is obtained with a minimum amount of friction,and the result of which is that the least possible belt power is required in operating the press. This movement consists of an arm, the upper end of which is attached directly to the crank shaft, the lower end of the arm being attached to the upper end of a yoke or clevice; the lower end of this clevice being attached to a link, and the link fulcrumed to the lower front side of the press frame; to the upper end of the yoke or clevice and straddled by the first arm referred to is the second arm which is fulcrumed to the rear side of the press frame. Attached to the clevice are two other links to which two bell cranks are attached, these bell cranks in turn being fulcrumed on the side of the press frame. The upper end of the bell cranks referred to are connected with two links, the upper end of these links being attached directly to the end of two rocker arm shafts, and in this manner operating the toggle movement to the blank holder of press.

In the use of the combination of the bell crank and yoke, the link movement referred to imparts a vertical movement to the yoke, and a practically perfect dwell during the entire working time of the forming punch is in this manner obtained.

The front and rear rocker arms at the top of press frame operating the inner toggle movement are made of steel. A heavy substantial frame connects the toggle movement and outer slide or blank holder. This blank

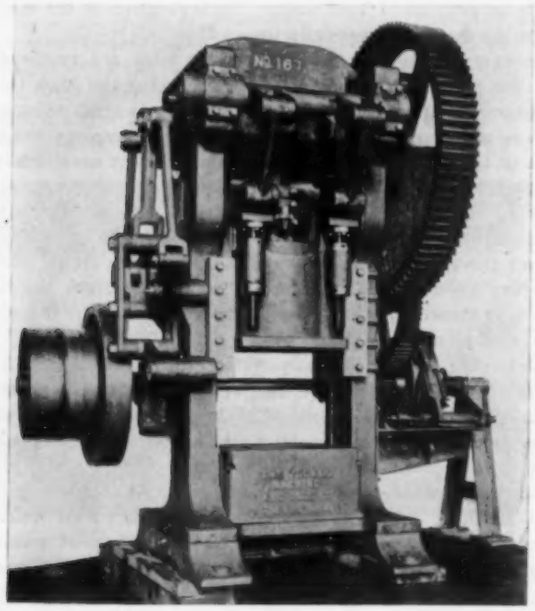


FIG. 1. NEW TOGGLE DRAWING PRESS.

holder is given a wide range of adjustment by means of the heavy studs at each of the four corners of outer slide. The crank is connected to the inner or forming punch, moving side of the outer slide or blank holder by means of a connection and screw. This connection has a cap held in position by four studs bearing perfectly on the threaded portion of screw, and in this way securely clamping the screw and positively preventing the screw from working loose. The adjustment of the screw is obtained by means of a gear and the adjusting pinion being thrown toward the operator to the front of the press, gives free access for an easy quick adjustment.

Some of the dimensions of the press illustrated are as follows:

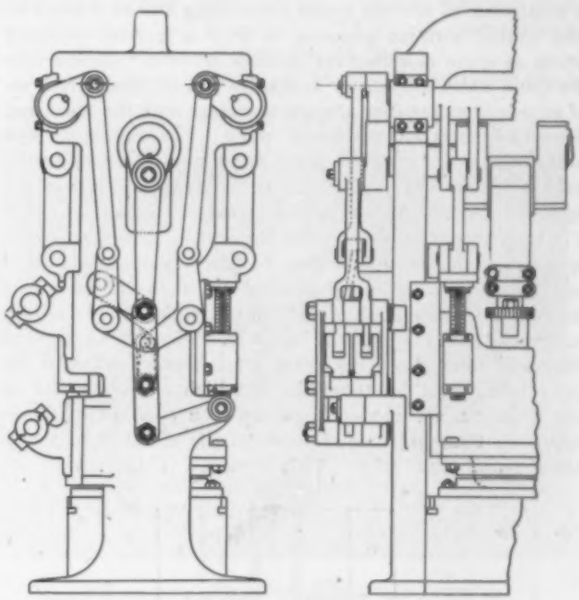


FIG. 2. VIEW WITH DRIVING GEARS REMOVED.

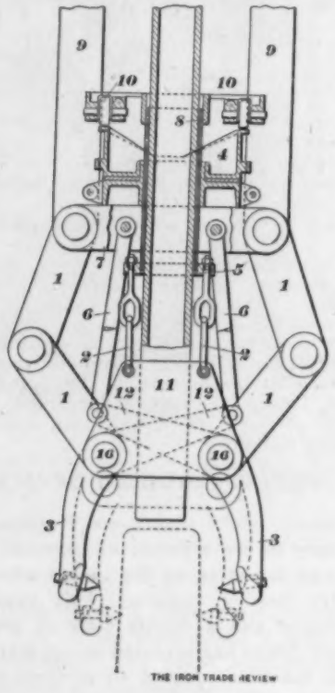
Weight 44,000 lb.
Width between uprights 35 inches.
Distance bed to blank holder, stroke down and adjustment up 16 inches.
Distance bed to plunger, stroke down and adjustment up 18 inches.
Stroke of blank holder 12 inches.
Stroke of plunger 17 inches.
Adjustment of blank holder 8 inches.
Adjustment of plunger 8 inches.

Capacity of press for drawing metal 16 gauge in thickness not exceeding 24 inches diam. This press is one of ten sizes recently placed on the market by the Toledo Machine & Tool Co., of Toledo, O., ranging in weight from 5,000 to 150,000 lb. for drawing sheet, tin, brass, copper, aluminum, steel and other metals.

METAL-HANDLING DEVICE.

In steel plants where ingots are stripped from molds, it is customary to use separate mechanisms for stripping the molds and for carrying the ingots when stripped to and from the heating furnace. This requires a double set of apparatus and a double crew of men to operate them. Henry Aiken has invented an apparatus for providing a single machine adapted to perform either kind of work as desired—that is, it will either grip an ingot or grasp an ingot mold or like object without necessarily exerting thereon the degree of force required in the gripping. The device is shown in the accompanying illustration. If the parts be in the position shown in this illustration, in which the links 1 are loose, and the tongshead is supported by the hangers 2 and it is then desired to operate the tongs 3 for the purpose of gripping an ingot, the cam 4 is turned sufficiently to lower the collar 5 and to cause the weight of the jaws to be borne by the links 6 from the cross head 7. This will cause the lower ends of the jaws to approach to such an extent as to grip an interposed ingot or other object, the tongs being provided with gripping spurs for this purpose. When the object is thus grasped, its weight, acting upon the jaws of the tongs

increases and intensifies the gripping action. To release the object from the tongs, the cam 4 is reversed so as to raise the cross head 8. This lifts the collar 5 and transfers the weight of the tongs to the hangers 2, whereupon the links 6 will cause the jaws to open and release their hold upon the object. During these motions of gripping and release the arms 1 remain loose and inactive and do not interfere with the action of the hangers of the links. If it is desired to use the tongs for raising an ingot mold or like object without gripping it with a gravity gripping action as above described the operator removes from the jaws the spurs which are readily detachable and the jaws which are of stirrup form are then adapted to engage with the usual lugs upon the sides of the ingot mold. The operator then brings the tongs over the ingot mold, and by lowering the links 9 lowers the tongs so that the jaws will be on the opposite side of the molds and under the lugs. The cam 4 is then turned so as to bring the wheels 10 to the lowest portion of the cam, and thus to lower the cross head 8 and collar 5, which is connected to it as shown. This loosens the connection 2 and transfers the weight of the tongshead to the jointed arms 1. The head 11 then descends until the arms 1 are straightened out, and the jaws being held by the links 6, which are connected to the arms 12, are moved together to a position of closer approach than before and to a definite distance of separation from each other. This distance is limited to the

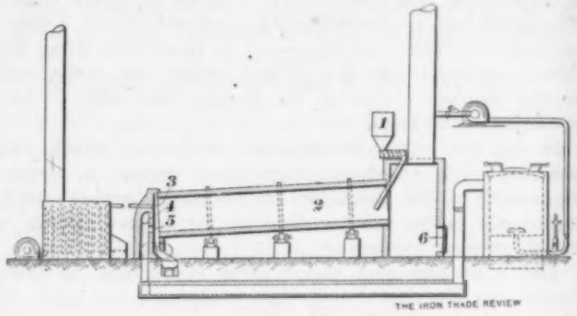


METAL HANDLING DEVICE.

distance to which the links 2 will descend before straightening the arms 1. The degree of their approach is so determined that the jaws will come into engagement with the ingot mold beneath the lugs, which they will hold without the gravity-gripping action above described. The ingot mold is then raised by elevating the links 9 and is deposited upon a car or other desired support. In order to release the tongs from the mold, the cam 4 is reversed so as to elevate the cross-head 8 and to transfer the weight of the tongshead from the connection 1 to the connection 2, which then lifts the tongshead into the position as shown.

METHOD OF TREATING IRON ORES.

A patent has been obtained by Mr. Carleton Ellis on the method of treating iron ores which can not be economically or satisfactorily reduced in the cupola furnace. This process has for its object the manufacture of iron or steel in a continuous manner, by the employment of a combination of flames which have sufficient reducing action to effect the reduction of the oxid to the metallic state, and which at the same time have sufficient heat intensity to afford an output of commercial significance. It has been proposed to manufacture iron by feeding the ore through a rotary kiln somewhat resembling those used in the manufacture of cement and to apply to the ore a reducing flame produced from pulverized fuel. Inasmuch as it is necessary in order to secure a complete reduction to have the flames of high temperature and at the same time of reducing nature (two properties which are incompatible), it has been found to be impossible to successfully manufacture iron in this manner. Ordinarily only ten to fifteen



ORE TREATING APPARATUS.

percent of the ore is reduced, and being mingled with so large an amount of inert matter the separation of the metal from the dross is practically impossible.

In carrying out this process rotary kilns are employed, but the flame application is made such that the high temperature required is accompanied by a powerful reducing action which permits of the practically complete reduction of the ore. This is accomplished by the employment of two or more flames or flame strata, one portion, that coming in contact with the ore, containing an excess of combustible matter—such, for instance, as carbon monoxid—and therefore having marked reducing properties, while another portion of the flame, more remote from the ore mass, is maintained at a high temperature due to the presence of plenty of oxygen or air.

Referring to the accompanying illustration, iron ore mingled with any suitable flux or with carbonaceous material is fed from the hopper 1 into the kiln 2, into its upper part. As the kiln rotates, the material moves gradually toward the lower end. Through the port 3 a supply of air is admitted to the kiln and through the ports 4 and 5 is admitted a stream of combustible gas. That issuing from the port 4 mingles with the air from the port 3 and a flame of very high temperature is produced, which heats up the thick wall of the kilnbarrel and by virtue of its heat radiating qualities reverberates an intense heat upon the mass of ore in the bottom of the kiln. Through the port 5, only producer gas is admitted, and owing to its high content of carbon monoxid the atmosphere around the material is of a strongly reducing nature. On account of the heat radiation from the flame above and from the kiln-lining and by heat conducted from the kiln-lining to the material by contact as the kiln revolves, the ore is rapidly deprived of its oxygen, and the iron therein contained is thereby rapidly and completely converted to the metallic state, whereupon the ore discharges into the conveyor at the lower end of the kiln and is taken to any point for further treatment.

CARNEGIE STEEL COMPANY'S STEEL TIE.

The Manufacturers' exhibit at the International Railway Congress held at Washington last May developed considerable interest in improved cross ties. The growing scarcity and consequent increase in the price of wooden ties have caused the railroad managements to resort to methods by which they could overcome this tendency, and for the past twenty years experiments have been made with various types of metal and concrete ties, the most of which have proven failures.

Six years ago, steel ties made with a 4-inch I beam having a plate 4½ inches wide riveted on the top and one 8 inches wide on the bottom, were placed in the tracks of the L. S. & M. S. at Sandusky, Ohio. These ties still remain in the track, and an examination made a short time ago developed the fact that there has been no corrosion, in fact the edges of the sheared plates have not been attacked and are as plainly defined as if sheared recently.

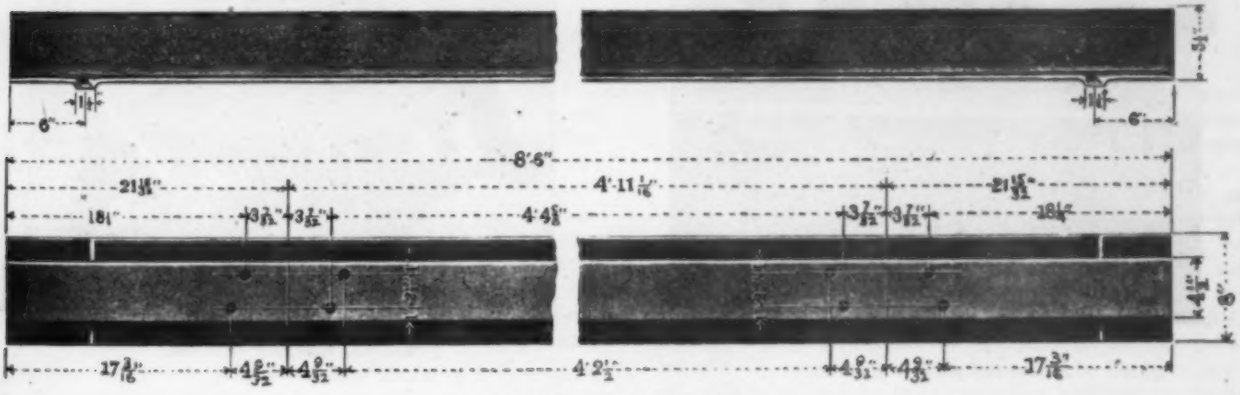
STEEL TIES ON PENNSYLVANIA LINES NEAR EMSWORTH, PA.

At the time the examination was made, it was observed that wood ties, which were placed in the track at the same time as the steel ties, had decayed and were being replaced with new ones. The Carnegie Steel Co. followed this experiment with the installation of several lots of ties rolled in the same shape, around its works and on the Bessemer & Lake Erie Railroad. While these ties were put in by the regular track force, with no special supervision, the results were sufficiently satisfactory to warrant an additional installation, and the Bessemer & Lake Erie Railroad has, during the year, used 25,000 at various points on its line where it was most difficult to maintain the track.

Between Euclid and Queen Junction, a distance of about five miles, the south bound main track is entirely equipped with these ties; and it is without doubt the most perfect piece of track on the road. While the curves are sharp, a train running at a speed of 55 miles per hour is handled as comfortably as if on tangent. The noise is more subdued than on wooden ties, the gauge is uniform throughout, and the surface and line can be maintained with less labor than needed on wood ties. It also develops that the wear of the rail is uniform. This road contemplates putting down 60,000 of these ties in 1906.

These ties have been in use on the Pennsylvania lines at Emsworth Station, near Allegheny, on the west bound passenger track, and are giving very good results. The insulation required by the automatic signals gave some trouble in the spring, due to imperfections, but this trouble was soon corrected by placing wooden blocks under the rails, and fibre bushings and washers around the bolts. We have reproduced a photograph showing condition of this track ready for winter, which shows it to be the best in the vicinity.

STEEL TIES ON SWITCHES, HOMESTEAD STEEL CO.



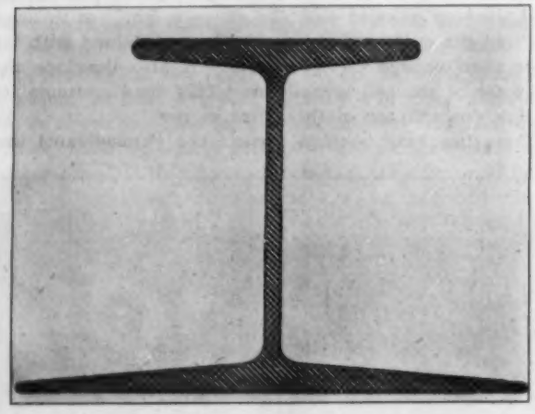
THE CARNEGIE STEEL TIE.

On account of the difficulty in holding track in line when experiments were made with the English trough sections, it was feared the steel tie would be a failure, but the recent experiments with the Carnegie I beam section with indentations in the base have proven that the fears were groundless.

The steel tie has therefore made more progress in the last two years than any other type of improved tie. Permanent as well as economical construction is demanded. The permanent feature has been developed, and a few more years will prove conclusively that steel tie construction is economical. Street railways are rapidly

developing new methods of constructing their tracks in the busy city streets.

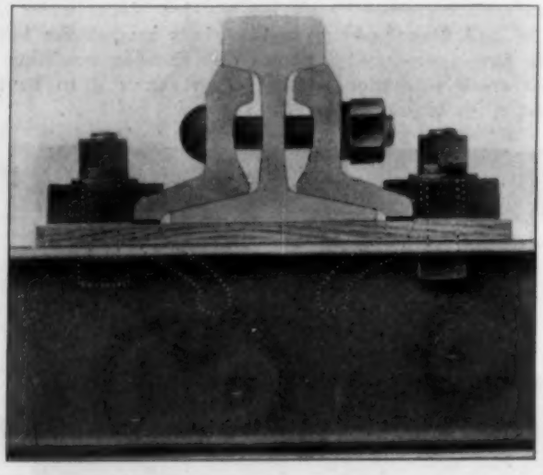
The Cleveland Electric Railway, during the summer, laid 600 Carnegie ties in concrete, and is very much pleased with the construction. The Manufacturer's Railway of



CROSS SECTION OF TIE.

St. Louis has installed this same section in a number of switches, with good results.

Physical tests of the tie show that a load of 170,000 lb. can be placed upon it before there is any sign of failure. A test of the fastening was recently made by mounting a rail on the tie, and standing it on end, applying the load vertically. It was found that with 17,500 lb. load the top flange began to buckle, permitting the rail to release itself. A similar experiment with a rail spiked to an oak tie with two spikes showed failure with a load of but 4700



INSULATED JOINT FASTENING.

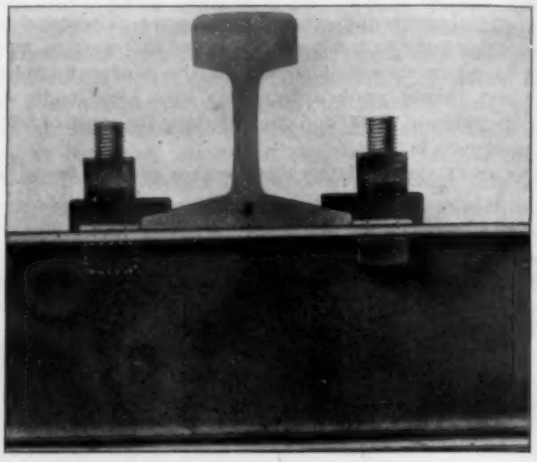
lb., and with four spikes holding the rail failure occurred at 12,500 lb. Physical as well as practical tests thus far are very favorable.

The steel cross tie that the Carnegie Steel Company is offering, is rolled in the form of a modified I beam 5½ inches deep, 8 inches lower flange, 4½ inches upper flange, which can be cut to any length.

It weighs 19 4-10 lb. per foot. There are four holes punched in each end of the tie at one operation by means of twin punches thereby insuring accuracy in gauge. The outer group of holes provide for the joint fastening and the inner group for intermediate.

The fastening is made by means of four ¾-inch bolts and four rolled steel clips, which fit accurately to the base of the rail.

The crimping in the bore six inches from the end of the

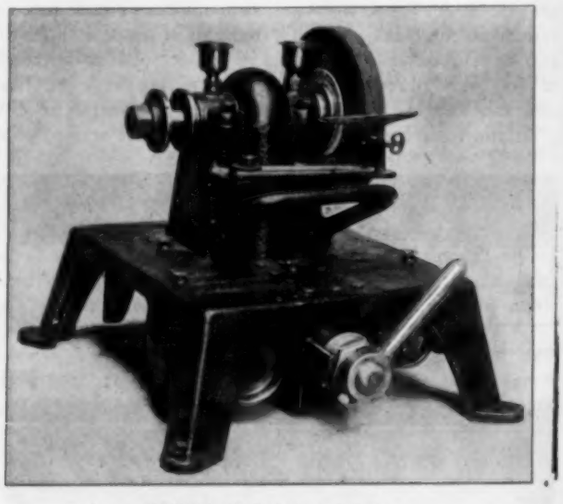


INTERMEDIATE FASTENING (UNINSULATED.)

tie is done at the same time as the punching and serves as an anchor to hold the truck from getting out of line.

PORTABLE PNEUMATIC GRINDER.

Among the many pneumatic tools which it is placing on the market, the Helwig Manufacturing Co. is making a portable pneumatic grinder. It consists of a small emery wheel ¾ in. by 6 in. mounted as shown in the accompanying illustration. The entire machine occupies a space but 12 x 15 x 12 inches, and since it weighs but 50 lb. the provisions for carrying it about make it readily portable.



HELWIG PORTABLE GRINDER.

The tool is provided with a clamping device for fastening quickly to any convenient place near the workman. It is especially designed to be used in railroad shops, ship yards, around steel construction and wherever light grinding is to be done.

The Western Machine Co., Ltd., has been incorporated, head office Toronto; capital $40,000; provisional directors, Bertram Thompson, George McLachlan and William J. Folliott.

Ten mills of the Shenango tin plant, New Castle, Pa., have resumed operations after an idleness of six months. About 1,000 men are employed.

LONGER COURSES

PROVIDED BY UNIVERSITY OF WISCONSIN TO BROADEN ENGINEERING TRAINING.

Stanford University and Union College are Building. —News of the Technical Schools.

In order to meet the increasing demand for engineers who have had the advantage of the broader training of a general college course, in addition to that of the present four year technical courses in engineering, the University of Wisconsin is providing this year, for the first time, five and six year courses in civil, mechanical, and electrical engineering. In these longer courses the students will have an opportunity to elect any studies that they desire in the college of letters and science, and will thus secure a broader foundation for their professional work. According to this new arrangement in these five and six year courses, the student will receive the degree of bachelor of science in general engineering at the end of four years; that of bachelor of science in civil, mechanical, or electrical engineering at the end of five years; and the professional degree of civil, mechanical, or electrical engineer at the end of six years. Special combinations of the present four year courses in engineering with the courses in commerce, agriculture, and law are also provided in five and six year courses, for those who desire preparation for special fields in engineering requiring a knowledge of these other subjects. The existing four year courses in engineering will be continued for those who desire the technical training only.

Thirty members of the senior class in the college of engineering, accompanied by Professors M. C. Beebe, G. C. Shaad, and H. J. B. Thorkelson, have just spent a week on their annual tour of inspection of the important engineering plants of the east. The party visited the Niagara Falls Power Co., the Canadian Power Development Co., the Canal Power Development and various industries using this power; and at Buffalo, they inspected the water works pumping station, the electric substation and power house, the Lackawanna Steel Works. Great Northern Elevator, American Dry Docks and the Buffalo Forge Co. The Brooks Locomotive works at Dunkirk, N. Y., the Westinghouse Electrical & Mfg. Co., the Westinghouse Machine Co., East Pittsburg, the Westinghouse Air Brake Co., Wilmerding, Pa., and the American Window Glass & Flint Glass Works, Jeanette, Pa., were visited and the rail mills and open hearth furnaces at Homestead, the National Tube Co.'s plant at McKeesport and a number of other plants in Pittsburg were included in the trip. At Pittsburg the program included the plants of the Nernst Lamp Co., R. D. Nuttall Co., the Standard Underground Cable Co., the Pittsburg Telephone Co., Phipps Power Bldg., Brashear Optical Works, the Pressed Steel Car Co. and the Allegheny County Light Co.

Stanford University Extensions.

There is now in process of construction at Stanford University an extension to the present machine shop measuring 140 x 50, and which will make when completed an entire area of 220 x 50. This large amount of additional space will be used primarily for two purposes, (1) the more adequate housing of the university mechanician shop and (2) the provision of space for large additions to the equipment of machine tools for purposes of instruction.

The university mechanician shop in Stanford University is placed under the supervision of the mechanical department and is intended to serve the needs of the various departments of the university where the services of skilled mechanicians are desired for the maintenance and repair of existing equipment and apparatus.

The Trustees of Stanford University have wisely chosen to centralize, and already the shop has been opened with an excellent equipment of precision and tool room lathes, milling and grinding machines, small tools, etc. With the larger space soon to be available further additions will be made to both equipment and employees. The department has been fortunate in securing as foreman of this shop Mr. F. A. Stevens who has had a varied and most useful experience in similar lines at Cornell University.

It is expected in the near future that the activities of this shop will require a force of four to six men and that it will prove a most important factor in the development of engineering and scientific work at Stanford University.

Worcester Polytechnic Institute.

Herbert P. Linnell, a graduate of the Civil Engineering Department of the Class of '94 who has for the past year been connected with the Isthmian Canal work, has been promoted to the position of resident engineer at Colon. In this position he will have charge of the construction of a reservoir of 500,000,000 gallons capacity and of a pumping station in which two Worthington pumps are to be installed, each with a capacity of 2,000,000 gallons, and two stand pipes one of 400,000 and the other of 500,000 gallons.

Two important foreign orders have just been received at The Washburn Shops for machinery, one for twelve

PHYSICS BUILDING AT OHIO STATE UNIVERSITY.

sensitive drills from Milan, Italy, and the other for sixteen drill grinders from St. Petersburg. Orders have also been received recently for a considerable amount of machinery to be shipped to Japan.

George E. Pellissier, '04, has resigned his position as chief engineer of the Holyoke Street Railway Co. to accept a position with the Goldschmidt Thermit Co., of New York. Mr. Pellissier was the first engineer in the United States to make a commercial use of thermit, the new material for welding together street railway rails; and his success in the use of that material led the Goldschmidt Co. to make him an offer which he finally accepted. His work will be in the principal cities of the West where he will have charge of reconstruction through the use of thermit.

Prof. C. M. Allen has just made some important tests on two large turbine units at the Berlin Paper Mills, Berlin, N. H. These units were of 1200 and 2000 h. p. respectively and the test was made by means of an Alden Absorption Dynamometer which was made up of four discs, each 16 inches in diameter. The test was of six hours' duration and was entirely successful in every way.

New Laboratory at Union College.

The new electrical laboratory at Union College is progressing rapidly, and the first story walls are ready for

the window frames. A description of the building follows.

The front portion, 73 feet east and west and 27 feet deep extends up two stories. The rear portion 35 feet in width and 74 feet front to back is but one story high. The ground floor is divided into three bays called east, west and main laboratories, besides two small bays, one of which will be used as coat room and the other as an entry, toilet and stair room. In the east bay will be the 100,000 volt transformer and other machines for high potential work. Here also the auxiliary apparatus will be kept. In the west bay will be the receiving and transforming apparatus for power supply to the laboratory and college. The college lighting system will be regulated from here. This bay will also be used for storing electrochemical apparatus and glass. Both the east and west bays will be lined with shelves to facilitate the storing of all auxiliary apparatus.

The main bay will be divided into two laboratories, and, in the rear, a few small rooms for thesis and graduate work. In the center of one of these main laboratories will be a gas engine for driving a direct current generator, for supplying power to the laboratory, which will be fed from a system of wiring on the ceiling with connections running down to the different apparatus.

Most of the apparatus, such as direct current machines, motors, dynamos, etc., from 60 to 500 volts, two alternators, three rotary converters, and a number of induction motors of different sizes, and the different kinds and types of transformers, etc. will be arranged along the walls. The college has an unusual amount of apparatus for electrical work, no characteristic machine being absent. Several machines need duplicating on account of the increased size of the class in electrical engineering, but in variety Union has an equipment equal to that of any college in the country. The appropriation of $2,000 for maintainance has hardly been touched this year and this will probably be used to duplicate some of the apparatus, and for purchasing small motors to run machines. The entire upper floor, with the exception of a small room set aside for professors, will be used as a drafting room and will be equipped throughout with new drafting tables. This and the main laboratory down stairs will be lighted by skylights as well as by the numerous windows in the side walls. The building itself is of pressed brick of two colors, and facings of stone. It will be lined down stairs with white pressed brick but the wall upstairs will be of plaster. The floor downstairs will be made of one foot of tile, cinders, and concrete, two inches of hemlock tongued and grooved, and eight inches of hard maple. This floor will be warmer than a concrete floor and will be sufficiently dead to place machines directly upon it. There will be no lecture room in the laboratory. Part of the present Electrical Laboratory will be reserved as a lecture room.

A change in the general engineering course of the college will soon take place. The change will be to allow students in this course, in their junior and senior years, to substitute for some of the more technical enginering subjects, studies along such lines as sociology, history, elementary law, economics and finance. The object of this change it to give students the opportunity of preparing themselves for administrative positions, where knowledge of these subjects is needed. Whether the option of taking this course will be granted to the present junior class has not yet been decided.

Notes of Other Colleges.

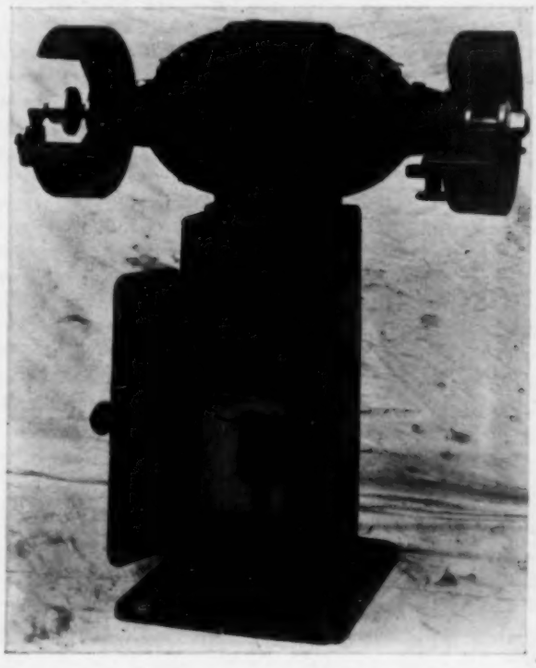
The first of a series of college lectures at Lehigh University was given Nov. 17 in the auditorium of the physical laboratory by E. J. Prindle, M. E. Lehigh, '90, a patent attorney of Washington, D. C., who spoke on "The Art of Making Inventions".

The main building of Vanderbilt University, destroyed by fire last April, is being reconstructed and ground has been broken for a new building which will be exclusively devoted to chemistry and pharmacy. Fire-proof construction will be used in both buildings, the floors being of reinforced concrete. Two of the floors have been put in the old building and the lower of these two floors has been fitted up for temporary use as a chemical laboratory. It is expected the new building will be ready for occupancy by next September.

Sheffield Scientific School, New Haven, Conn., is the recipient of a $250,000 gift from M. D. Viet of Granby, Conn. With the exception of the original Sheffield endowment and the two $2,000,000 for dormitories presented by Frederick W. Vanderbilt, this is the largest gift to the school.

A MOTOR DRIVEN DRY GRINDER.

The Ransom Mfg. Co., Oshkosh, Wis., has recently developed a new 12 inch motor driven double end dry grinder, which is shown in the accompanying illustration. The emery wheels are mounted upon an extended armature shaft, which is made of high carbon steel burned and ground. It is large in diameter in proportion to the work it has to do, and the spindle is 1¼ inches in diameter where the emery wheels are placed. The journals are ring oiling and run in phosphor bronze dust proof boxes. The machine as shown is mounted upon a heavy substantial



12 IN. DOUBLE END ELECTRIC DRY GRINDER.

base with ample floor area to insure steady running.

A starting box, switch, and non-arching fuses are mounted inside of the pedestal. The machine operates at 1700 revolutions per minute, and is capable of carrying two 12 x 2 inch emery wheels. The machine can be furnished for direct current of any voltage.

The company has been making for several years 18 x 2, 24 x 3 and 30 x 4 motor driven dry grinders, and this present machine has been added to make the line more complete.

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The World Engineering & Construction Co., Rochester, N. Y., has been incorporated for the purposes of constructing and contracting with $100,000 capital stock. The incorporators are: William H. Underwood, New York; W. A. Underwood, Wheeling, W. Va.; Le Grand Brown and William L. Perrin, both of Rochester, N. Y.

The Lancaster & Engelman Engineering Co., New York, has been incorporated to manufacture patent and mechanical devices and machinery with a capital of $50,000. The incorporators are: James H. Lancaster, 26 Cortlandt St., Eugene M. Engelman, 126 Greene street; and Otto C. Sommerich, 277 Broadway, all of New York.

The Continental Machine Co., Syracuse, N. Y., has been incorporated to manufacture engines, boilers, machinery, tools, etc., with a capital stock of $5,000. The incorporators are: T. G. Cranwell and J. C. Taliaferro, Syracuse; F. P. Assman, East Orange, N. J.; and A. M. Norton and B. H. Larkin, Chicago.

The Walsenburg Foundry & Mfg. Co., Walsenburg, Colo., has been incorporated with $25,000 capital stock by James Autrey, George Foruth, Adolph Unfug, J. B. Farr and Ernest Ruth, Walsenburg.

The Car Foundry Co., Sycamore, Ill., has been incorporated with $30,000 capital stock to manufacture machinery, tools and implements. The incorporators are: F. B. Townsend, Frank C. Patton and William R. Tapper.

The Baker City Iron & Supply Co., Baker City, Ore., has been incorporated with a cash capital of $25,000 to manufacture mining and milling machinery, sheet-iron work, hoisting engines, etc. The new company succeeds the Baker City Engineering Works.

McClerman & Orr, Chicago, have been incorporated to manufacture steel products with $25,000 capital stock. The incorporators are: Frank F. Murray, Walter L. Gillam and Walter C. Haight.

The W. D. Hofius & Co., Seattle, Wash., has been incorporated as the Hofius Steel & Equipment Co., with a capital stock of $200,000. W. D. Hofius and George J. Danz are named as the trustees.

The M. Funk Boiler Works Co. and the Reliance Boiler Works Co. have been consolidated into the La Crosse Boiler Co., La Crosse, Wis., with $40,000 capitalization. The incorporators are: M. Funk and William F. Funk of the Funk Co., and William Solberg and Louis Solberg of the Reliance Boiler Works Co. For the time both plants will be operated separately under the one management but it is the intention to transfer the business to a larger plant later on.

The Milford Machine Co., Boston, Mass., has been incorporated to deal in machinery, etc., with a capital of $25,000. The officers are: President, Charles Borland; treasurer, E. F. Warren, both of 50 State street, Boston; and clerk, J. P. Hines, Maple street, Danvers, Mass.

The Consolidated Engineering Co., New York, has been incorporated for the purpose of constructing public works. The capital is $100,000. The incorporators are: E. G. F. R. du Mazuel, 787 Lexington avenue; K. L. Franklin, 5 Nassau street; E. Martin, 787 Lexington avenue; Thomas Arnoldi, 11 Pine street, all of New York; Walter Peggs, 38 East Twenty-second street, Bayonne, N. J.

The Dunn Machinery Co., Atlanta, Ga., has been incorporated with $25,000 capital stock to deal in machinery, etc. The officers are: W. J. Dunn, president and general manager; A. L. Dunn, vice president and treasurer, and John G. Clements, engineer in charge. The company's office is at 54 Marietta street.

New Construction:—

The By-Product Coke Corporation, which has built 120 ovens at South Chicago, Ill., expects to have this plant in operation by the beginning of the new year. Pickands, Brown & Co. have been appointed exclusive sales agents for this coke.

The Excelsior Boiler & Sheer Iron Works, Joplin, Mo., has outgrown its present quarters and is erecting three buildings which it will occupy soon after Jan. 1.

The Western Iron & Foundry Co., Wichita, Kas., is adding a large boiler room to its plant and is arranging for the installation of much new machinery.

The Buhl Malleable Iron Co., Detroit, is preparing to increase the capacity of its plant by the erection of two buildings, one 45 x 100 feet and the other 80 x 180 feet. These will be finished by February when probably 150 more men will be employed.

The Lennox Furnace Co., Marshalltown, Ia., has broken ground for a foundry building 50 x 140 feet and will make the castings needed in its other departments.

The United Iron Works Co., Springfield, Mo., is erecting new machine shops and foundry at Aurora, Mo., which includes a main shop 80 x 105 feet, a boiler house 30 x 30 ft., a foundry 40 x 65 ft., a blacksmith shop 25 x 35 ft., and an office storage house and fuel building. The equipment in the old plant at Aurora will be moved to the new buildings.

The Oliver Iron Mining Co., will erect a machine shop 60 x 100 ft. at Ishpeming, Mich., the contract for which has been let to the American Bridge Co. The most modern equipment in the way of tools, traveling cranes, etc., will be installed.

The Mead Drill Mfg. Co., has removed its plant from Burdett to Geneva, N. Y., where it will construct a plant for the manufacture of grain drills and other implements. A foundry 50 x 100 ft. will be erected, a machine shop 40 x 50 ft., a three-story warehouse, 50 x 125 and an office building, all of which will be of fire proof construction. The company desires complete foundry and machine shop equipment, modern labor saving contrivances and will be pleased to receive information and catalogs for such requirements together with quotations on concrete blocks, lumber, iron and coal.

Options have been secured on a tract of 30 acres in the manufacturing district of Cleveland as the probable site of a new rolling mill. The identity of those interested is kept secret. The land optioned adjoins the Crescent Mills of the American Sheet & Tin Plate Co., and lies between East Madison and Upton Streets. It has excellent railway facilities, being crossed by the Erie and C. & P. lines, besides Bessemer St. The location of the plant is in the hands of S. G. Morris of Cleveland.

Fires:—

The Decatur Milling Co., Decatur, Ill., which lost its plant by fire Nov. 24, reports that it does not expect to rebuild.

The annex plant of the Keuffel & Esser Co., New York, manufacturing engineering supplies, was destroyed by fire Dec. 8, with a loss estimated in the neighborhood of $100,000.

The Union Dry Dock Co., Buffalo, N. Y., was visited by fire Dec. 8, which destroyed the blacksmith shop causing a loss of about $10,000.

The foundry of the Ruggles Machine Co., Poultney, Vt., was practically destroyed by fire Dec. 9, damage being

estimated at $10,000. The adjoining machine shop and most of the machinery and tools were saved.

The Harriman Hoe & Tool Co., Harriman, Tenn., suffered a loss of about $50,000 Dec. 6, when its finishing plant was destroyed by fire.

General Industrial Notes:—

The Troy Fdy. & Machine Co., recently incorporated at Troy, O., is now erecting a plant in that city for the manufacture of heavy castings. A specialty will be made of soil pipe, but the new company has also made important contracts for furnace and machinery castings. J. W. Morris is president and Wm. M. Harp manager.

The David Bell Engineering Works, which a few days ago incorporated a business which has been conducted since 1845 at Buffalo, N. Y., will develop its specialty of steam hammers, increasing its line of products to include double frame steam hammers and improved steam drop hammers. The officers are H. T. Dunbar, president; David Bell, vice-president and general manager; F. C. Slee, secretary and George G. Bell treasurer.

No change in policy is contemplated by the Syracuse Twist Drill Co., Syracuse, N. Y., its recent incorporation being only for the purpose of giving an interest in the business to a number of employes who have been faithful to its interests for over 20 years.

Chas. A. Calder, general manager of the Toledo Shipbuilding Co., in an address at a banquet recently tendered the officers of the new concern by the business men of Toledo, said: "We are going to more than double the capacity of the present plant. Plans are now being prepared for the second and third drydock, so that we can commence operations on these as soon as the spring opens."

The will of James B. Oliver, president of the Oliver Iron & Steel Co., Pittsburg, who died Nov. 28 after a brief attack of pneumonia, shows an estate worth about $7,500,000 of which $5,000 is bequeathed to the Southside Hospital, $5,000 to the Pittsburg Association for the Improvement of the Poor, $1,000 to the Young Men's Christian Association of Sewickley, from $5,000 to $10,000 to each of several relatives and 1,000 shares of the Oliver Iron and Steel Co. to his son, Daniel. His other interests in the Oliver Iron & Steel Co. are left to his widow and four children, with provision that the dividends are to be paid to them.

The American Stoker Co., Erie, Pa., has acquired from the McMyler Mfg. Co., Cleveland, its chain grate stoker business which has been operated under the name of the Victor Chain Grate Stoker. The acquisition includes patterns, patents, drawings and good will. F. Girtanner, designer of the stoker, enters the employ of the American Co. The Victor stoker, which has been in use for some time, differs from the general line of chain grates in that it has a rear attachment consisting of clinker-breaker and dumping bars so attached that the fires can be forced and the capacity of the boiler increased without smoke or extra waste of fuel. Hereafter it will be known as the American Chain Grate Stoker and will be handled concurrently with the Underfeed Stoker of the American Co.

The Niles Boiler Co., Niles, O., will start its foundry Jan. 1. It has cupola capacity for 50 tons of iron per day and is commanded by a 20-ton electric traveling crane, besides being supplied with all necessary trackage for handling materials to advantage. H. S. Pell, who recently assumed charge of the company, has had large experience in boiler shop and foundry practice. For a number of years he was superintendent with James P. Witherow & Co., New Castle, Pa., in building blast furnaces and steel plants, and for 10 years was engineer and superintendent of the Stirling Co., manufacturer of water tube boilers.

Directors of the Northwestern Construction Co., Chicago, recently visited the Birmingham, Ala., district investigating the feasibility of erecting there a large plant for the manufacture of gas tanks, fixtures, etc. Options on factory sites, it is reported, have been secured, and definite action on the proposition is expected at the directors' meeting in January.

W. J. Gunn of Fall River, Mass., has purchased the foundry of the Household Sewing Machine Company at Providence, R. I.

The entire plant of the Alabama Tube & Iron Co., Helena, Ala., will be sold at auction Jan. 15. It is equipped for manufacturing bar iron and wrought iron pipe.

No. 2 furnace of the Brooke Iron Co., Birdsboro, Pa., has gone out of blast on account of the burning out of the brick work of the bosh.

For the first time in its history, Germany's monthly production of pig iron passed the million ton mark, the exact output for October being 1,006,943 tons.

The newly-elected officers of the Seneca Wire & Mfg. Co., Fostoria, O., which will devote its attention chiefly to the manufacture of nails, are R. Crocker, president; E. A. Henry, vice president and general manager; C. A. Gribble, secretary and treasurer. In addition to these John Noble, Ira Cadwallader and C. C. Anderson are directors.

The Roane Iron Co., Chattanooga, is rushing repairs on its No. 2 blast furnace at Rockwood, Tenn., in order to have it ready for blowing in early in the new year. No. 1 was blown in some time ago.

The machine shops of the Winlock Iron Works, Winlock, Wash., have been purchased by L. Staples of Duluth and A. C. McKinnon of Winlock. New machinery will be installed for the manufacture of small engines and boilers.

The Sound Iron Works, Everett, Wash., at an early date will move to Chehalis, Wash., where a building 60 x 200 feet will be erected.

The Detroit Shipbuilding Co. has elected new officers as follows: president, W. C. McMillan, formerly vice president, who succeeds Alexander McVittie who has become president of the new Toledo Shipbuilding Co.; vice president and treasurer, M. E. Farr, formerly secretary; and secretary, E. K. Ketcham who is promoted from the position of cashier. W. L. Brown, chairman of the American Shipbuilding Co. directory board, becomes a director of the Detroit Co. The position of manager is abolished.

The firm of John F. Allen has announced that the only agents authorized to sell the Allen riveting machines are Joseph T. Ryerson & Sons, Scully Steel & Iron Co., Baird Machinery Co., A. B. Bowman, Berger-Carter Co., and the Fairbanks Co.

The Morgan Construction Co., Worcester, Mass., announces that it has moved the headquarters of its European office from 1 Arundel street, Strand, London, to 52 Rue du Congres, Brussels, Belgium.

The American Machine Mfg. Co., Detroit, has bought the plant of the Detroit Trolley & Mfg. Co. and will manufacture automobile parts.

It is announced in Oswego, N. Y., that the plant of the Railway Steel Spring Co. recently built at that place will begin operations on January 1, with a force of 1500 men.

The Morgan Spring Co., Worcester, Mass., and Struthers, O., announces the selection of the following directory boards: Directors resident at Worcester; Chas. H. Morgan, president, Jerome R. George, Rufus B. Fowler, Frank F. Bullard and Paul B. Morgan, treasurer; Directors resident at Youngstown, O.: Henry Wick, vice-president, Warner Arms, Walter A. Beecher and H. W. Heedy. The executive committee consists of Henry Wick, Youngs-

town, Jerome R. George and Paul B. Morgan. The bolt machinery at the Struthers plant will be placed in operation early in the year and the mill for rolling wire rods is expected to start in February.

The American Malleable Casting Co., Marion, O., recently incorporated for $100,000, has purchased the plant at that city of the Marion Malleable Co. The incorporators, all of Cleveland, are: W. C. Merrick, Gustave Von Den Steinen, Horace Andrews, W. B. Stewart and Edward A. Kline. Charles L. LaMarsh of Cleveland and P. J. Martin, it is stated, will assume executive charge.

Trade Notes:—

The Belle City Malleable Iron Co., Racine, Wis., reports that in spite of a 400 percent growth in its plant during the last five years, the rapidly increasing business of its railway specialty department will probably compel further additions at an early date. Its anti-rail creeper, which has been on the market for the past two years, has been phenomenally successful.

The Seidel & Hastings Co., Wilmington, Del., is rolling plates for the construction of vessels for use at Panama. It is working under contract for the Maryland Steel Co. Sparrows Point, Md., which is building a number of boats for the Canal Commission.

The Macbeth Iron Co., Cleveland, has received an order from the Pennsylvania Lines for four "Swedenborg" grab buckets of one and one-half tons capacity of iron ore for use on the docks at Sandusky, O. It will also rebuild the Excelsior derricks now on this dock and equip them for the operation of grab buckets.

One of the largest single shipments of plate girder bridges ever made went forward recently from the Rankin plant of the McClintic-Marshall Construction Co., Pittsburg. The shipment consisted of an entire train of 56 cars loaded with 44 deck plate girders, each 80 feet long, and eight feet high, and each weighing twenty tons. It went through direct to destination, Freemont, Neb., as a solid train via Pittsburg, & Lake Erie, Lake Shore and C. B. & C. The girders are for the Platte River bridge on the Great Northern Railroad, seventy-two of this length being required. The company's new shop No. 2 at Rankin, Pa., is almost completed, and will more than double the capacity of the plant at that place. In connection with the Pottstown plant it will give the concern an enormous capacity for structural materials.

John Gill & Sons, who recently secured the contract for the erection of the Cleveland Trust building, Cleveland, have sub-let the contract for the structural steel required, approximately 900 tons, to the Brown-Ketcham Iron Wks., Indianapolis.

The Amsler Engineering Co., Pittsburg, has just installed a battery of five of its patent gas producers for the Indiana Bottle & Glass Co., Cicero, Ind., a battery of three for the Milgrove Bottle Co., Milgrove, Ind., and one for the Southern Indiana Glass Co., at Loogootee, Ind. A month ago the engineering company completed the 50-ton blast furnace for the Northern Iron Company, Standish, N. Y., and is now doing a heavy amount of reinforced concrete work, the largest job being the construction of walls for the big Cincinnati & Southern railroad, Race and Front Streets, Cincinnati. The four walls are 1,100 ft. long, 24 ft. high and from 12 to 18 inches wide. Of the walls, all of which are reinforced concrete, two have been completed and the others are well along.

The directors of the Carnegie Technical Schools, Pittsburg, have let the contract for the erection and equipment of a model foundry to include a 7-ton Whiting cupola, Whiting foundry elevator and No. 6 Sturtevant steel pressure blower with Morse chain drive to 15 h. p. motor.

The Van Dorn Iron Works Co., Cleveland, has been awarded the contract for the erection of the new shop buildings of the Connellsville, Pa., Machine & Car Co. Work will be started at once. The buildings, which will be of steel construction finished in brick, will cost about $20,000.

The Midland Steel Co., Pittsburg, has let the contract for the iron work on its new blast furnace at Cook's Ferry, near Beaver, Pa., to the Riter-Conley Mfg., Pittsburg. The engineering work is in the hands of George W. McClure, Son & Co., of Pittsburg, who will put in their hot blast stoves at the plant.

The Edison Electric Co., Los Angeles, Cal., has let the contract for lining its pressure tunnel to be constructed for the Kern River No. 1 power plant to the Risdon Iron Works, San Francisco, Cal. The main steel lining will weigh approximately 400 tons and that of the branch connections about 150 tons.

The Oregon Water Power & Railway Co. has awarded the contract for all the water wheels for its new Clokmas river plant at the dam at Cozidoro, near Portland, Ore., to the Platt Iron Works Co., Dayton, O. The new plant will cost over $500,000 and will develop 20,000 horsepower.

The Westinghouse Electric & Mfg. Co., Pittsburg, has secured contracts amounting to about $5,000,000 for the electrification of the street railroad system of St. Petersburg, Russia. This is the first of a series of contracts which will be let by the Russian authorities for this kind of work.

CANADIAN NEWS NOTES.

TORONTO, CAN., Dec. 16.—A new 850 horsepower unit has been put into operation in the power house of the Dominion Iron & Steel Co., Sydney, N. S., which is the largest of its type in the maritime provinces. The record for production at the open-hearth steel furnace of the company was made recently when 902 tons were turned out in 24 hours. The company has received an inquiry for steel rails from the Klondike Mines Railway Co., which is constructing a line from Klondike City to Dawson.

The Nova Scotia Steel & Coal Co. will install an electric plant in its new colliery to be known as Sydney No. 4, preparations for the opening of which are now being made.

The Western Canada Flour Mills Co. is erecting a mill of 2000 barrels per day capacity at Winnipeg. It will be operated by electricity. The company has given a contract to the Allis-Chalmers-Bullock, Ltd., of Montreal, for the electrical equipment including two synchronous motors of 500 h. p. capacity each and a number of smaller motors, which, ranging from 5 to 200 h. p. each, aggregate 750 h. p. Plans for the new mill in course of erection by the Keewatin Flour Mills at Keewatin, Ont., provide for a building in which can be installed machinery of a capacity of 6000 barrels per day. The Allis-Chalmers Co. of Milwaukee has the contract for furnishing machinery with a capacity of 4000 barrels daily with which the mill can be started. The rest can be added in future if required without interfering with operations.

At the sittings of the Tariff Commission at Winnipeg on Dec. 6 representatives of over 80 farmers' associations were present and presented resolutions adopted unanimously embodying their demands. These included tariff reductions on many lines of goods including agricultural inplements, threshing machinery and vehicles, and that wire fencing to be placed on the free list. In consideration of these changes they expressed their willingness that the duties on agricultural produce should be removed.

IN DESPERATE STRAITS.

British Consumers of Pig Iron are Offering Premiums.—Peculiar Wage Scale Adjustment.

(Special Correspondence.)

BIRMINGHAM, ENGLAND., Dec. 12.—The principal event of the past fortnight has been the wages decree of the Midland Iron and Steel Wages Board which met in Birmingham on Thursday last. The special wage board issued the following resolution:

"After duly considering the results shown by the North of England ascertainment, we declare that the rate of wages continues 8s 6d per ton for puddling basis price—millmen's wages in proportion, commencing December 4, and continuing until Saturday, February 3, 1906." The reference to the North of England will be noted. It will be remembered that at present the Midlands have no sliding-scale. Consequently, by a resolution passed in May of last year its board meets periodically and decides to "follow the North." In other words it adopts the northern wages with an allowance of 6d per ton "in lieu of Northern extras." The system is very far from ideal, as the two districts are in many respects very different, and there is a strong suspicion that prices have ascended faster in the Midlands than in the North. However, the Northern ascertainment showed an increase in price on the two months from £5 18s 11.56d to £6 0s 0.34d—too small an increase to give an advance. The Midland Board is getting and recording out prices from about a score of firms, but this is solely for future requirements, to decide how to fix the basis of the new scale to be established some months hence, and the figures have not been allowed to leak out. The small increase speaks eloquently as to the influence of old contracts, a number of which have still to be worked out.

The wages declaration had a steadying effect on finished iron prices, which with one exception remained unchanged. The exception was galvanized hollow ware, advanced another 5 percent. Pig iron too creeps steadily upward, Northampton forge realizing £2 17s 6d, a figure not reached for many years past. Users loudly protest that pig-makers are rushing prices ruinously, but while they protest some of them are in such desperate straits for iron that they are offering premiums for delivery as the only way of keeping their works going. Several in fact have had enforced holidays for lack of pig iron. The inevitable result of this is still higher prices, the latest step being a decision of South Staffordshire makers to abolish the customary 2½ discount.

As was expected the firm of Messrs. J. & S. Roberts, Swan Foundry, West Bromwich has decided to close, and some 200 men were dismissed on Saturday last. So ends one of the most famous foundries in South Staffordshire after an honorable career of seventy years. Both the brothers James and Samuel have been dead some years. A curious fact is that the firm to the time of closing had ample orders; but for peculiar reasons production had become unprofitable. Other firms in the neighborhood, such as Messrs. C. Akrill & Co., and Messrs. Josiah Guest & Co., the former of which has been enlarging considerably, will probably divide between them nearly all the orders of the disappearing firm.

Activity has necessitated enlargement at the works of the Knutton Iron Co., North Staffordshire, which has erected fifteen puddling furnaces, and greatly increased the output of its mills. All the works in the district, which are practically all well designed and up-to-date, are very busy.

The Great Central Railway Co. lately gave out a remarkable number of orders for locomotives. The following firms are all working on such orders:—Messrs. Beyer Peacock & Co., Gorton Foundry, the Yorkshire Engine Co., Sheffield, and Messrs. Kitson & Co. of the Airedale Foundry Co., Leeds. The above-named railway company is credited with the intention of building new works on land near Manchester for the manufacture of their own engines. In view of the scarcity of pig-iron in the Midlands a curious circumstance is the continued increase of the stock tonnage in Connal's stores, Middlesboro. This now amounts to 660,000 tons, and is increasing at the rate of 1400 tons a day. A suggestion has been made within the last few days that four or five furnaces should cease production to arrest this increase, but there is not the least probability of this being carried out.

The council of the Iron and Steel Institute has arranged that the annual general meeting of the Institute shall be held in London on May 10 and 11, 1906. In place of the usual autumn meeting a joint meeting with the American Institute of Mining Engineers will be held in London on July 23 to 28. It is intended during the week following to give the American visitors an opportunity of seeing some of the iron-making districts.

The Ironclad Housewarming.—The Ironclad Mfg. Co., Brooklyn, made the occupation of its new steel barrel factory Dec. 2 the occasion for a unique house-warming, employes and invited guests participating in an elaborate reception and ball in the great building. The Ironclad Company was founded some fifty years ago by Robert Seaman; since his death two years ago the business has been conducted by Mrs. Seaman, who had made herself thoroughly familiar with the workings and needs of the plant by spending a year working in its various departments. Before her marriage to Mr. Seaman she was engaged in newspaper work, where under the pseudonym of "Nellie Bly" she attracted wide attention by her descriptions of intolerable factory conditions, and when she came into control of the Ironclad plant she speedily began the introduction of reforms which have made the factory a model one and its 1,200 employes fortunate in the possession of a library, clubroom, dining rooms, educational committees, a mutual aid association, a vacation camp in the mountains and many other novel and useful features.

The Otis Elevator Co., New York, has recently issued a handsome catalog, 7¾ by 9¼ inches, containing 62 pages, in which are described and illustrated the general elevating machinery and apparatus manufactured by that company. The catalog is profusely illustrated with full page illustrations, showing double worm and geared electric elevator, single belt electric freight elevator, vertical cylinder hydraulic elevator, horizontal cylinder high pressure elevator engine, direct-acting plunger elevator, Mt. Beacon incline railway, Weehawken incline railway, and Eiffel Tower, Paris, France. The catalog also contains a number of diagrams showing the standard relations of hatchway, platform and car sizes.

Mr. Gibson on Advertising.—The Technical Publicity Association, composed of the advertising managers of machinery and electrical manufacturing plants east of Ohio, were addressed at an open meeting at the Aldine Association Dec. 8 by Geo. H. Gibson on "Lost Motion in Machinery Advertising". He spoke of the trade and technical press as "a widely used and important medium of conveying information to users of machinery and allied products", and followed with an extensive plea for a uniform column width for all trade papers and with a discussion of circulations as it concerns the advertiser.

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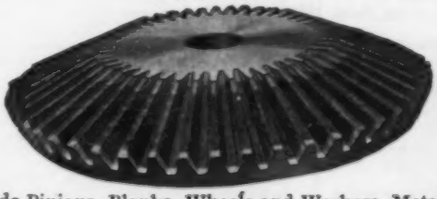
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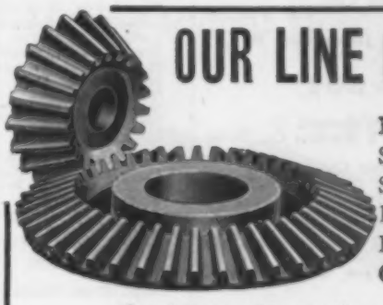
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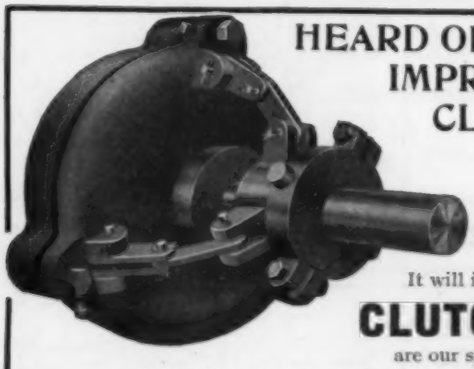
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Phosphor Bronze Smelting Co., Philadelphia, Pa.

Metals (Free From Carbon)—
Goldschmidt Thermit Co., New York City.

Metal Sawing Machines—
Railway Appliances Co., Chicago, Ill.

Milling Machines—
The Adams Co., Dubuque, Ia.
Baird Machinery Co., Pittsburg, Pa.
Becker-Brainard Milling Machine Co., Hyde Park, Mass.
Cincinnati Milling Machine Co., Cincinnati, O.
The W. P. Davis Mach. Co., Rochester, N. Y.
Niles-Bement-Pond Co., New York.
Vandyck Churchill Co., New York City.

Mining Machinery—
The Atlas Car & Mfg. Co., Cleveland, O.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Dravo, Doyle & Co., Pittsburg, Pa.
Farrel Foundry & Machine Co., Ansonia, Conn.
Great Lakes Engineering Co., Detroit, Mich.
Ingersoll-Rand Co., New York City.
Jeffrey Mfg. Co., Columbus, O.
Lidgerwood Mfg. Co., New York City.
Link-Belt Machinery Co., Chicago, Ill.
Marion Steam Shovel Co., Marion, O.
McLanahan-Stone Mach. Co., Hollidaysburg, Pa.
Thew Automatic Shovel Co., Lorain, O.
Vulcan Iron Works Co., Toledo, O.
The Wellman-Seaver-Morgan Co., Cleveland.

Molding Machines—
The Adams Co., Dubuque, Ia.
The S. Obermayer Co., Cincinnati and Chicago.
J. W. Paxson Co., Philadelphia, Pa.
Henry E. Pridmore, Chicago, Ill.
The J. D. Smith Fdy. Supply Co., Cleveland.
Tabor Mfg. Co., Philadelphia, Pa.
Taylor, Wilson & Co., Ltd., Allegheny, Pa.

Motors (Electric)—
Crocker-Wheeler Co., Ampere, N. J.

Nameplates—
Turner Brass Works, Chicago, Ill.

Oil Tanks and Cars—
Girard Boiler & Mfg. Co., Girard, O.
The Meehan Boiler & Construction Co., Lowellville, O.
Niles Boiler Co., Niles, O.

Packing—
James Bonar & Co., Pittsburg, Pa.
Jenkins Bros., New York City.

Paint—
Jos. Dixon Crucible Co., Jersey City, N. J.

Patents—
Shepherd & Parker.

Patterns—
Balkwill Pattern Works, Cleveland, O.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Canton Foundry & Machine Co., Canton, O.
The Forsyth Pattern Co., Youngstown, O.
Gobeille Pattern Co., Cleveland, O.
R. E. Kidder, Worcester, Mass.
The Macbeth Iron Co., Cleveland, O.
The Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.
The Wellman-Seaver-Morgan Co., Cleveland, Ohio.

Pattern Letters—
Cleveland Galvanizing Works, Cleveland, O.
The S. Obermayer Co., Cincinnati and Chicago.
J. W. Paxson Co., Philadelphia, Pa.
The J. D. Smith Fdy. Supply Co., Cleveland.

Pig Iron—
Carnegie Steel Co., Pittsburg, Pa.
Reed F. Blair & Co., Pittsburg, Pa.
Bourne-Fuller Co., Cleveland, O.
Clinton Iron & Steel Co., Pittsburg, Pa.
Columbus Iron & Steel Co., Columbus, O.
Corrigan, McKinney & Co., Cleveland, O.
David Evans, Chicago, Ill.
Robt. Field Sales Agency Cincinnati, O.
M. A. Hanna & Co., Cleveland, O.
Hickman, Williams & Co., Chicago, Ill.
LaBelle Iron Works, Steubenville, O.
Ernest Law & Co., Philadelphia, Pa.
J. Tattnall Lea & Co., Philadelphia, Pa.
McKeefrey & Co., Leetonia, O.
Pickands, Brown & Co., Chicago, Ill.
Pickands, Mather & Co., Cleveland, O.
Republic Iron & Steel Co., Chicago, Ill.
Richardson & Co., Pittsburg, Pa.
Rogers, Brown & Co., Cincinnati, O.
Scully Steel & Iron Co., Chicago, Ill.
Shenango Furnace Co., Pittsburg, Pa.
F. B. Stevens, Detroit, Mich.
Superior Charcoal Iron Co., Grand Rapids, Mich.
Thomas Furnace Co., Milwaukee, Wis.
L. & R. Wister Co., Philadelphia, Pa.

Pipe—
Bourne-Fuller Co., Cleveland, O.
Girard Boiler & Mfg. Co., Girard, O.
La Belle Iron Works, Steubenville, O.
The Meehan Boiler & Construction Co., Lowellville, O.
National Tube Co., Pittsburg, Pa.
Pittsburg Valve, Foundry & Construction Co., Pittsburg, Pa.
United States Cast Iron Pipe & Fdy. Co., New York.

Pipe Covering—
Jenkins Bros., New York City.

Pipe Mill Machinery—
Bignall & Keeler Mfg. Co., Edwardsville, Ill.
Standard Engineering Co., Ellwood City, Pa.
Taylor, Wilson & Co., Limited, Allegheny, Pa.
Union Foundry & Machine Co., Pittsburg, Pa.
Stoever Fdy. & Mfg. Co., Myerstown, Pa.

Planers—
Baird Machinery Co., Pittsburg, Pa.
Cleveland Punch & Shear Works Co., Cleveland, O.
The W. P. Davis Mach. Co., Rochester, N. Y.
J. J. McCabe, New York City.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Hartford, Conn.
Vandyck Churchill Co., New York City.
Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass.

Pneumatic Tools—
Cleveland Pneumatic Tool Co., Cleveland, O.
Dayton Pneumatic Tool Co., Dayton, O.
General Pneumatic Tool Co., Montour Falls, N. Y.
Independent Pneumatic Tool Co., Chicago, Ill.
Ingersoll-Rand Co., New York City.
Ryerson, Jos. T. & Son, Chicago.
Scully Steel & Iron Co., Chicago, Ill.

Pointing Machines (Wire)—
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Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

Power Transmission Equipment—
Crocker-Wheeler Co., Ampere, N. J.

Presses—
Alliance Machine Co., Alliance, O.
Bertsch & Co., Cambridge City, Ind.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
E. W. Bliss Co., Brooklyn, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Farrel Fdy. & Mach. Co., Ansonia, Conn.
Great Lakes Engineering Wks., Detroit, Mich.
Long & Allstatter Co., Hamilton, O.
Mackintosh, Hemphill & Co., Pittsburg, Pa.
Morgan Construction Co., Worcester, Mass.
Niles-Bement-Pond Co., New York.
Toledo Machine & Tool Co., Toledo, O.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Watson, Stillman Co., New York City.
Williams, White & Co., Moline, Ill.
R. D. Wood & Co., New York City.

Pumps—
James Bonar & Co., Incor., Pittsburg, Pa.
A. S. Cameron Steam Pump Works, New York.
Dean Bros. Steam Pump Works, Indianapolis, Ind.
The Deming Co., Salem, O.
Dravo Doyle & Co., Pittsburg, Pa.
Farrel Foundry & Machine Co., Ansonia, Conn.
Great Lakes Engineering Wks., Detroit, Mich.
Ingersoll-Rand Co., New York City.
F. M. Prescott Steam Pump Co., Milwaukee, Wis.
Southwark Foundry & Machine Co., Philadelphia, Pa.
The Wm. Tod Co., Youngstown, O.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Watson, Stillman Co., New York City.
R. D. Wood & Co., Philadelphia, Pa.

Punches and Shears—
Alliance Machine Co., Alliance, O.
Bertsch & Co., Cambridge City, Ind.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
E. W. Bliss Co., Brooklyn, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Cleveland Punch & Shear Wks. Co., Cleveland.
Farrel Foundry & Machine Co., Ansonia, Conn.
George A. Hogg Iron & Steel Fdy. Co., Pittsburg, Pa.
Long & Allstatter Co., Hamilton, O.
Mackintosh, Hemphill & Co., Pittsburg, Pa.
Morgan Construction Co., Worcester, Mass.
National Machinery Co., Tiffin, O.
R. S. Newbold & Son Co., Norristown, Pa.
Niles-Bement-Pond Co., New York.
Jos. T. Ryerson & Son, Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.
Toledo Machine & Tool Co., Toledo, O.
United Engineering & Fdy. Co., Pittsburg, Pa.
Vandyck Churchill Co., New York City.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Watson-Stillman Co., New York City.
Williams, White & Co., Moline, Ill.
R. D. Wood & Co., Philadelphia, Pa.

Punch Tools—
Blomfeldt & Rapp, Chicago, Ill.
Pratt & Whitney Co., Hartford, Conn.

Pyrometers—
Edward Brown, Philadelphia, Pa.
Charles Englehard, New York City.
S. H. Stupakoff, E. E., Pittsburg, Pa.
Uehling-Decker Co., Passaic, N. J.

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Bourne-Fuller Co., Cleveland, O.
Carnegie Steel Co., Pittsburg, Pa.
The Cleveland Car Co., West Park, O.
L. B. Foster Co., Pittsburg, Pa.
A. G. Hathaway & Co., Cleveland, O.
Hyde Bros. & Co., Pittsburg, Pa.
Arthur Koppel Co., New York City.
Ernest Law & Co., Philadelphia, Pa.
Richardson & Co., Pittsburg, Pa.

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J. W. Paxson Co., Philadelphia, Pa.
The J. D. Smith Fdy. Supply Co., Cleveland.

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J. W. Paxson Co., Philadelphia, Pa.
The J. D. Smith Fdy. Supply Co., Cleveland.

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Pratt & Whitney Co., Hartford, Conn.

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Pratt & Whitney Co., Hartford, Conn.

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Alliance Machine Co., Alliance, O.
John F. Allen, New York City.
Chambersburg Engineering Co., Chambersburg, Pa.
General Pneumatic Tool Co., Montour Falls, N. Y.

Rivet Making Machinery—
National Machinery Co., Tiffin, O.

Rivets—
American Iron & Steel Mfg. Co., Lebanon, Pa.
Bourne-Fuller Co., Cleveland, O.
Garland Nut & Rivet Co., Pittsburg, Pa.
Arthur C. Harvey & Co., Boston, Mass.
A. G. Hathaway & Co., Cleveland, O.
Lockhart Iron & Steel Co., Pittsburg, Pa.
Joseph T. Ryerson & Son, Chicago, New York and Pittsburg.
Scully Steel & Iron Co., Chicago, Ill.

Riveting Machines—
John F. Allen, New York City.
Alliance Machine Co., Alliance, O.
Chambersburg Engineering Co., Chambersburg, Pa.
The Cleveland Machine & Mfg. Co., Cleveland, O.
Cleveland Pneumatic Tool Co., Cleveland, O.
Cleveland Punch & Shear Wks. Co., Cleveland.
General Pneumatic Tool Co., Montour Falls, N. Y.
Hanna Engineering Works, Chicago, Ill.
Independent Pneumatic Tool Co., Chicago, Ill.
Ingersoll-Rand Co., New York City.
Niles-Bement-Pond Co., New York.
Joseph T. Ryerson & Son, Chicago, New York and Pittsburg.
Scully Steel & Iron Co., Chicago, Ill.
Watson-Stillman Co., New York City.
R. D. Wood & Co., Philadelphia, Pa.

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Jeffrey Mfg. Co., Columbus, O.

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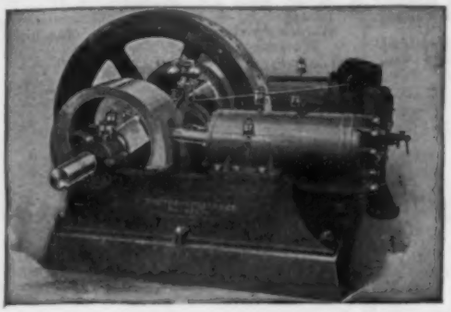
Mesta Machine Co., Pittsburg, Pa.
Seaman, Sleeth Co., Pittsburg, Pa.
United Engineering & Fdy. Co., Pittsburg, Pa.
The Wm. Tod Co., Youngstown, O.
Wheeling Mold & Fdy. Co., Wheeling, W. Va.

Rolling Mill Machinery—
Alliance Machine Co., Alliance, O.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
The Cleveland Machine & Mfg. Co., Cleveland, O.
Farrel Fdy. & Machine Co., Ansonia, Conn.
Fischer Fdy. & Mfg. Co., Pittsburg, Pa.
Girard Boiler & Mfg. Co., Girard, O.
George A. Hogg Iron & Steel Foundry Co., Pittsburg, Pa.
Macbeth Iron Co., Cleveland, O.
Mackintosh, Hemphill & Co., Pittsburg, Pa.
Mesta Machine Co., Pittsburg, Pa.
Morgan Construction Co., Worcester, Mass.
Niles-Bement-Pond Co., New York.
R. S. Newbold & Son Co., Norristown, Pa.
Standard Engineering Co., Ellwood City, Pa.



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Republic Iron & Steel Co., Chicago, Ill.
Russel Wheel & Fdy. Co., Detroit, Mich.
N. & G. Taylor Co., Philadelphia, Pa.
Joseph T. Ryerson & Son, Chicago, New York and Pittsburg.
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W. H. Thompson & Co., Philadelphia.
United Steel Co., Canton, O.

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Marion Steam Shovel Co., Marion, O.
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Crucible Steel Co. of America, Pittsburg, Pa.
Cumberland Steel Co., Cumberland, Md.
Harrow Spring Co., Kalamazoo, Mich.
Arthur C. Harvey & Co., Boston, Mass.
Wm. Jessop & Son, New York City.
Jones & Laughlin Steel Co., Pittsburg, Pa.
La Belle Iron Works, Steubenville, O.
Ernest Law & Co., Philadelphia, Pa.
Lockhart Iron & Steel Co., Pittsburg, Pa.
Otis Steel Co., Cleveland, O.
Republic Iron & Steel Co., Chicago, Ill.
Joseph T. Ryerson & Son, Chicago, New York and Pittsburg.
Scully Steel & Iron Co., Chicago, Ill.
W. H. Thompson & Co., Philadelphia, Pa.
Wm. B. Walter & Co., Chicago, Ill.
L. & R. Wister & Co., Philadelphia, Pa.
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